

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION

Office  
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Palm Desert, CA 92260  
[waterboards.ca.gov/coloradoriver/](http://waterboards.ca.gov/coloradoriver/)

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**ORDER R7-2022-0011**

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**Order Information**

<b>Dischargers:</b>	CalEnergy Operating Corporation, Vulcan BN Geothermal Power Company, and Magma Power Company
<b>Facility:</b>	"Region 2" Vulcan and Del Ranch (Hoch) Power Plants
<b>Address:</b>	7001 Gentry Road, Calipatria, CA 92233
<b>County:</b>	Imperial County
<b>WDID:</b>	7A132033001 and 7A132040014
<b>GeoTracker ID:</b>	L10003292609
<b>Prior Order(s):</b>	R7-2015-0022, R7-2009-0028, 94-083, 91-054, 92-031, 91-051

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I, PAULA RASMUSSEN, Executive Officer, hereby certify that the following is a full, true, and correct copy of the order adopted by the California Regional Water Quality Control Board, Colorado River Basin Region, on April 12, 2022.

*Original signed by*  
PAULA RASMUSSEN  
Executive Officer

## Contents

Findings.....	1
Board Order History.....	2
Facility Operations and Wastewater Disposal .....	3
Waste and Unit Classification .....	7
Hydrogeologic and Climate Conditions.....	11
Regional Geology .....	12
Basin Plan and Other Regulatory Considerations .....	13
Antidegradation Analysis .....	16
Stormwater .....	17
Financial Assurances.....	17
CEQA and Public Participation .....	18
<b>IT IS HEREBY ORDERED .....</b>	<b>18</b>
A. Discharge Prohibitions .....	18
B. Discharge Specifications.....	19
C. Stormwater Specifications.....	22
D. Monitoring Specifications .....	23
E. Corrective Action Specifications.....	24
F. Financial Assurances Specifications .....	25
G. Closure and Post-Closure Specifications .....	26
H. Special Provisions.....	26
I. Standard Provisions .....	27
Attachment A—Facility Location Map.....	1
Attachment B—General Facility Map .....	2

ORDER R7-2022-0011	2
CALENERGY OPERATING CORP. ET AL	
REGION 2 VULCAN AND DEL RANCH (HOCH) POWER PLANTS	
Attachment C—Geothermal Solids Management Schematic .....	3
Attachment D—Schematic of Additional Filter Press at Ponds .....	4
Attachment E—Schematic of Filter System at Edge of Ponds .....	5
Attachment F—Monitoring WEll Map .....	6
<b>Monitoring and Reporting Program R7-2022-0011 .....</b>	<b>1</b>
Part I: Sampling and Analysis General Requirements.....	1
A. Sampling and Analysis General Requirements.....	1
B. Standard Monitoring Provisions .....	1
Part II: Site-Specific Monitoring Requirements.....	4
A. Groundwater Monitoring.....	4
B. Unsaturated Zone Monitoring.....	7
C. Surface Water Monitoring.....	7
D. Surface Impoundment Monitoring .....	8
E. Evaluation Monitoring.....	12
F. Corrective Action Monitoring .....	14
Part III: Evaluation of Monitoring Data.....	14
A. Water Quality Protection Standard .....	14
B. Statistical and Non-Statistical Analysis of Data .....	15
Part IV: Reports to be Filed With the Regional Water Board.....	18
A. Required Reports .....	18
B. Report Schedule .....	22
C. Standard Reporting Procedures.....	22

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION

**ORDER R7-2022-0011**

WASTE DISCHARGE REQUIREMENTS  
FOR  
CALENERGY OPERATING CORPORATION, OPERATOR  
VULCAN BN GEOTHERMAL POWER COMPANY AND  
MAGMA POWER COMPANY, OWNERS  
“REGION 2” VULCAN AND DEL RANCH (HOCH) POWER PLANTS  
CLASS II SURFACE IMPOUNDMENTS  
IMPERIAL COUNTY

The California Regional Water Quality Control Board, Colorado River Basin Region (Regional Water Board) hereby makes the following Findings:

1. CalEnergy Operating Corporation (CalEnergy) operates the “Region 2” Vulcan and Del Ranch Geothermal Power Plants (collectively, Facility), a 92-megawatt power generating facility. The Facility includes two “Brine Ponds” used for the temporary storage of geothermal brine and associated solids. The Facility also includes the associated geothermal well field, conveyance pipelines, and other infrastructure needed to properly operate the Facility. The Facility is located at 7030 Gentry Road, Calipatria, California 92233.
2. The Facility is comprised of two adjacent individual power plants, the Vulcan Power Plant and the Del Ranch Power Plant.<sup>1</sup> There is a separate Brine Pond located at each plant. The North Pond is at the Del Ranch Power Plant, whereas the South Pond is at the Vulcan Power Plant. The Facility layout is shown on **Attachment B**, General Facility Map, incorporated herein.
3. In accordance with California Code of Regulations, title 27, section 20005 et seq. (Title 27), this Order regulates the continued operation, maintenance, monitoring and eventual closure of these Brine Ponds as Class II Surface Impoundments (alternatively referred to as Waste Management Units [WMUs] or Units). This Order is strictly limited in scope to Waste Discharge Requirements (WDRs) for the existing Brine Ponds, and does not address, regulate or authorize any other discharges of waste, including to the various injection wells associated with the Facility.

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<sup>1</sup> The Del Ranch Plant was previously referred to as the “Hoch Power Plant.”

4. As operator of the Facility and its Brine Ponds, CalEnergy is the party designated as having primary responsibility for compliance with the provisions of this Order.
5. The Brine Ponds are situated on property owned by the Magma Power Company (Magma) vis-a-vis its subsidiary, Vulcan BN Geothermal (Vulcan). Magma and Vulcan (collectively, Magma-Vulcan), as property owners, are secondarily responsible for compliance with this Order and shall be responsible for compliance with this Order in the event of CalEnergy's noncompliance, and after written notice to Magma-Vulcan.
6. For the purposes of this Order, CalEnergy and Magma-Vulcan are collectively referred to in singular form as "Discharger."
7. The Facility is located in the Salton Sea Known Geothermal Resource Area (KGRA), approximately seven miles west of the town of Calipatria in Imperial County. The Facility is located at latitude 33.163 and longitude -115.62, as shown on **Attachment A**, Location Map, incorporated herein.
8. On October 14, 2021, the Discharger submitted a Report of Waste Discharge (ROWD) to the Regional Water Board in response to the Regional Water Board's request so that updated WDRs could be adopted for the Facility. The Facility is assigned California Integrated Water Quality System (CIWQS) and Waste Discharge ID (WDID) Nos. 7A132033001 and 7A132040014, and GeoTracker Global ID No. L10003292609.
9. The Facility was most recently regulated under Order R7-2015-0022, adopted June 11, 2015. The WDRs have been updated to reflect proposed changes in site operations, including updated mechanical separator Best Management Practices (BMPs) to more efficiently manage the buildup of geothermal solids in the Brine Ponds.

#### **Board Order History**

10. The Facility is currently operating under Order R7-2015-0022, which superseded Order R7-2009-0028.
11. Prior to Order R7-2009-0028, the Brine Ponds were regulated under separate WDRs orders.
  - a. North Pond (Del Ranch Power Plant): The first order (Order 91-051) for the Del Ranch Facility was adopted in November 1991 and a second order (Order 92-031) was adopted in May 1992. Order R7-2003-0078 combined and updated Orders 91-051 and 92-031 to comply with applicable provisions of Title 27.

- b. South Pond (Vulcan Power Plant): The first order (Order 91-054) for the Vulcan Facility was adopted in November 1991 and a second order (Order 94-083) was adopted in September 1994. Order R7-2003-0126 combined and updated Orders 91-054 and 94-054 to comply with applicable provisions of Title 27.
- 12. Orders R7-2003-0126 and R7-2003-0078 were updated and combined under Order R7-2009-0028 to include facility upgrades including installed background and compliance wells for the existing brine holding ponds.
- 13. This Order updates the WDRs in Order R7-2015-0022 to comply with current laws and regulations, as set forth in the Water Code and California Code of Regulations, and to document changes to the Facility or operating procedures that could impact groundwater.

**Facility Operations and Wastewater Disposal**

- 14. The Facility’s power plants use steam from hot (450° to 500° F) geothermal brines to turn turbines to produce electricity. The brines are obtained from production wells that extend 2,500 to 9,500 feet below the ground surface. After the energy is extracted, the brines are returned to the subsurface via injection wells. The well field includes numerous production and injection wells and insulated conveyance pipelines.
- 15. Electricity is generated by injecting the hot brine into one or more separators where the water flashes into steam, which then is used to propel a turbine generator. The steam is then cooled and condensed and either used in the plant’s cooling system or injected back into the geothermal reservoir.
- 16. After steam is extracted for power generation, most of the spent brine is routed directly to injection wells where it is reintroduced into the ground. The number and location of geothermal production and injection wells in use at any given time varies. Table 1 reflects the number and ownership of properties associated with the Facility’s geothermal production and injection wells in operation at the time of permit adoption and is included for informational purposes only:

**Table 1 – Well Name, Use, Location and Ownership**

Well ID	Well Name	Well Type	APN	Owner
DR-10	Del Ranch 10	Production	020-110-040	Imperial Magma*
DR-11	Del Ranch 11	Production	020-110-040	Imperial Magma*

Well ID	Well Name	Well Type	APN	Owner
DR-14	Del Ranch 14	Production	020-110-040	Imperial Magma*
M-10	M-10	Production	020-110-040	Imperial Magma*
M-16	M-16	Injection, Condensate	020-110-042	Imperial Magma*
M-17	M-17	Injection, Plant	020-110-042	Imperial Magma*
MM-18	Magmamax 18	Injection, Condensate	020-110-047	Imperial Magma*
VIW-04	Vulcan IW-04	Injection, Hot Brine	020-120-047	Smith, et al **
VIW-08	Vulcan IW-08	Injection, Hot Brine	020-120-047	Smith, et al **
DRIW-01	Del Ranch IW-01	Injection, Hot Brine	020-120-048	Smith, et al **
DRIW-02	Del Ranch IW-02	Injection, Hot Brine	020-120-048	Smith, et al **
DRIW-03	Del Ranch IW-03	Injection, Hot Brine	020-120-048	Smith, et al **
DRIW-08	Del Ranch IW-08	Injection, Hot Brine	020-120-048	Smith, et al **
VIW-01	Vulcan IW-01	Injection, Hot Brine	020-120-048	Smith, et al **
DR-12	Del Ranch 12	Production	020-110-008	Imperial Magma*
M-6B	M-6B	Production	020-110-008	Imperial Magma*
DRIW-09	Del Ranch IW-09	Injection, Hot Brine	020-120-059	Imperial Magma*
M-19	Magmamax 19	Injection, Plant/pond	020-120-060	Imperial Magma*

Well ID	Well Name	Well Type	APN	Owner
20	Del Ranch 15	Production	020-110-040	Imperial Magma*

\* Imperial Magma, LLC, 7030 Gentry Road, Calipatria, CA 92233

\*\* Robert Bruce Smith, Katherine Lynne Smith Worrell, David Ray Smith, and Leslie O. Smith, 681 Marilyn Lane, Brawley, CA 92227

17. The Department of Conservation, Geologic Energy Management Division<sup>2</sup> (CalGEM) regulates the drilling, operation, and closure of geothermal wells, as well as the reinjection of geothermal brine from the well head into the geothermal aquifer, including but not limited to: approval of wells for reinjection; flow rate and volume of geothermal fluids reinjected; well location; casing design; casing leak detection; additives; and leak detection and inspection.
18. A small portion of brine is routed to the Brine Ponds rather than being directly reinjected, primarily brine associated with system startup, shutdown, or malfunction events. The Brine Ponds also hold fluids generated during other onsite activities that are described more fully in the section entitled Waste Unit Classification. Fluid from the Brine Ponds is routinely recycled back into the power plant's piping system, where it reenters the process flow of the Facility.
19. A primary function of the Brine Ponds is removal of precipitating solids from the brines. In addition to the solids settling out by gravity, the Discharger may use several mechanical separator systems to remove solids from the brine, as follows:
  - a) A filter composed of inert material such as sand or diatomaceous earth inside a "sock" of polypropylene yarns or other permeable material;
  - b) A filter press that squeezes water from solids; and,
  - c) Woven geotextile filter bags, usually made of 100 percent polypropylene yarns, that retain solids while allowing liquid to seep out.

The mechanical separator systems either pump the filtrate back into the geothermal process circuit or the systems are placed on an impermeable surface next to the Brine Ponds (such as inside a 'roll-off bin') and the liquid is allowed to return to the Brine Ponds. In either case, the separated solids are retained in the separator system for eventual disposal offsite. Flow diagrams

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<sup>2</sup> Formerly Division of Oil, Gas and Geothermal Resources (DOGGR).

depicting the mechanical separator systems are included as **Attachments C, D and E.**

20. The Facility also has a freshwater makeup pond to supply water to the cooling towers. This Order does not regulate the operation of these freshwater ponds.
21. Chemicals are added to the cooling water system and brine handling process to prevent scaling, biological growth, and corrosion and to adjust the water's pH and inhibit undesirable chemical reactions. Chemical classes approved of at the time of permit adoption include Class 5 oxidizing organic peroxides and biocide in the cooling tower; Class 8 corrosives as industrial strength oxidants and biocides; hydrochloric acid for pH control at some locations in the process, and sodium hydroxide for control at other locations in the process, among other chemicals. Table 1 includes a list of the chemical products currently used at the Facility. The use of new chemicals requires Executive Officer approval.

**Table 2: Approved Chemical Products**

Chemical Treat. Product Names	Purpose	Nalco Equivalent
CL5428	Dispersants	3DT121, 3DT133, 3DT191, 3DT102
CL456, CL452, CL453	Biodetergent/Surfactant	73551, 73550
CT775, CT709, CT788, CL5788, CT790, CL1495	Corrosion Inhibitor - phosphate based	3DT487, 3DT184, 3DT195
CL216, CL2250, CL2150, CL2115, CL2065	Non Oxidizing Biocides	7614, 7330, 7320, 7338
12.5% Sodium Hypochlorite (Bleach)	Bleach Oxidizing Biocide	-
CL41, CL4520	chlorine / bromine oxidizing biocides used in conjunction with an oxidant such as bleach (NaOCl)	1318
CL241	Anti-Foam	7471
C2187T	TowerBrom tablets	TowerBrom 991

Chemical Treat. Product Names	Purpose	Nalco Equivalent
C2184G	TowerBrom granular	TowerBrom 960
GS5810	Tower Cleaning	-
CL4822, P8000L	Prevent Iron Deposition	-

22. A surface water conveyance system is located underfoot throughout both power plants to collect wastewater generated from cleanups and washdowns. The conveyance system is concrete lined and covered by an open grate. Wash-down water is discharged through the conveyance system to the brine holding ponds.

### Waste and Unit Classification

23. The Discharger is permitted to place geothermal liquids and geothermal solids along with geothermal drilling waste in the Brine Ponds, which are Class II surface impoundments and waste management units under Title 27.
24. The two Brine Ponds are the only WMUs at the Facility. The South Pond was reconstructed in 2007 by building a new pond within the existing footprint of the original pond. The construction of the ponds is summarized in Table 3, below.

**Table 3: Waste Management Units at the Facility**

Unit	Capacity (Gallons)	Liner System	Status
North Pond	1,685,400	Protective Layer – Two feet of cement-stabilized sand compacted to 90 percent (Proctor method); Primary Layer – Synthetic 35-mil XR-5 flexible membrane; Leachate Collection and Removal System (LCRS) – One foot of compacted Class II millimeter run granular material compacted to 90 percent; Lower Layer – Two feet of clay compacted to 80 percent.	Active

Unit	Capacity (Gallons)	Liner System	Status
South Pond	807,800	Protective Layer – Six-inch fiber-reinforced concrete underlain by six inches of soil; Primary Liner – 80-mil flexible membrane: LCRS – HDPE Hyper-net; Lower Layer – 80-mil flexible membrane; Geosynthetic clay liner; Preexisting Liner – 45-mil Hypalon flexible membrane Preexisting LCRS – 1-foot of granular material compacted to 90 percent; Preexisting Bottom Layer – None (native soil).	

25. The North Pond is within earthen berms that extend three to five feet above the surrounding land surface and is roughly square in shape measuring approximately 200 feet by 200 feet. The granular compacted layer beneath the synthetic liner is part of the Leachate Collection and Removal System (LCRS). The LCRS has five leachate collection zones, each of which consists of a shallow, gravel-filled trench oriented along the perimeter of the Pond that contains a perforated, four-inch diameter pipe that drains horizontally to a sump located outside the footprint of the pond through a three-inch diameter polyvinyl chloride (PVC) pipe. Each of the five LCRS sumps are three-foot diameter concrete pipes oriented vertically and covered with a steel lid. The drainage pipes enter the sumps above the bottom of the sumps. The volume of each sump before the water backs up into the LCRS collection layer is about 250 gallons. The sumps are numbered TW-1, TW-2, TW-3, TW-4, and TW-5.
26. The South Pond is also located within berms that extend three to five feet above the surrounding land surface, but the outer surface is protected by a veneer of concrete. The South Pond is approximately 100 feet in a north-south direction and 300 feet in an east-west direction. The LCRS consists of a layer of high-density polyethylene (HDPE) Hyper-net, a grid-like material that allows leachate penetrating beyond the primary liner to be collected and directed to a narrow sump under the upper liner in the western portion of the impoundment. The narrow sump is about 30 feet long and about 1 foot wide and contains a 4-inch pipe that drains to a 4-foot square depression that an access pipe extends into. The depressions are filled with sand or gravel and are surrounded by concrete. Access to the sump for measurement and

- pumping-out purposes is through a pipe named LDS-1. The storage volume of the South Pond Sump, before leachate backs up into the collection layer, is approximately 150 gallons.
27. All of the following wastewater streams are directed to the Brine Ponds and/or to the injection wells for direct injection into the geothermal reservoir:
- a. Cooling tower blowdown;
  - b. Geothermal drilling wastes;
  - c. Geothermal waste;
  - d. Geothermal brine (liquids),
  - e. Geothermal brine precipitates (solids);
  - f. Portable shower effluent;
  - g. Spills and water from hydroblasting;
  - h. Wastewater generated from plant cleanups and washdowns, including water collected by the plant conveyance system;
  - i. Vehicle wash station effluent;
  - j. Process filtrate from the Brine Pond filter press, geotextile solids-dewatering bags (used to dewater geothermal solids before final disposal), or other mechanical separator Best Management Practices (BMPs) that the Discharger is granted approval to use by the Executive Officer;
  - k. Lime sump effluent; and
  - l. Effluent from emission abatement equipment.
28. The geothermal brine at the Facility, which is highly saline (over 10,000 mg/L total dissolved solids [TDS]) and may also contain high concentrations of metals, is considered “designated waste”,<sup>3</sup> which is defined in Water Code section 13173 as nonhazardous waste containing pollutants that, under ambient environmental conditions at a WMU, could be released in concentrations exceeding applicable water quality objectives or otherwise adversely affect beneficial uses of the waters of the state. (See also Cal. Code Regs., tit. 27, § 20210.) Constituents of concern in the geothermal brine

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<sup>3</sup> Geothermal fluids managed in surface impoundments such as the Brine Ponds are expressly exempted from management as “hazardous waste” pursuant to Health and Safety Code section 25143.1.

- that have the potential to exceed water quality objectives for areal surface waters and groundwater include total dissolved solids (TDS) and heavy metals. Therefore, the discharge is a designated waste and, as such, must be discharged to waste management units regulated under Title 27.
29. Periodically, the Discharger may need to remove solids from the Brine Ponds that precipitate out of the liquid brine as it cools or settles. The Discharger is responsible for conducting confirmation sampling of the removed solids and disposing of the solid waste at a proper final disposal facility. With proper maintenance, the Brine Ponds will continue to function as designed and the required freeboard level of two feet can be maintained.
  30. According to the Discharger, any hazardous waste generated or stored at the Facility, that is not a “designated waste,” is stored and disposed of in a manner compliant with federal and state regulations, and not placed into the Brine Ponds.
  31. Title 27, section 20240, subdivision (c) establishes a prescriptive standard that existing surface impoundments be “operated to ensure that wastes will be a minimum of five feet (5 ft.) above the highest anticipated elevation of underlying ground water.” The purpose of this prescriptive standard is to ensure that groundwater does not come into contact with the waste inside the WMU, thereby becoming leachate. (State Water Board, Statement of Reasons for 1984 Rule, Section II.B.6.a [Cal. Code Regs., tit. 23, § 2530], p. 3.8) In other words, the purpose of the five-foot separation requirement is to minimize the generation of leachate.
  32. Title 27, section 20080, subdivision (b) provides that, in lieu of compliance with a prescriptive standard, the Board may authorize an “Engineered Alternative” where compliance with the prescriptive standard is demonstrated to be infeasible.
  33. In accordance with section 20080, the Board hereby determines that the Brine Ponds’ construction constitutes an appropriate “Engineered Alternative” to the prescriptive standard of five feet of groundwater separation from groundwater. Specifically, the Brine Ponds’ liners and leachate collection and removal systems, which meet the performance standards for Class II units (see Title 27, § 20310, subd. (a)) are such that groundwater will be unable to enter into the ponds and commingle with the existing wastewater. Thus, the Brine Ponds’ construction provides equivalent protection against water quality impairment.
  34. Moreover, compliance with the prescriptive standard would require the Discharger to lower the groundwater table, which would involve a massive amount of pumping—all at great cost both in terms of energy consumption

and financial expenditures. In other words, compliance with the prescriptive standard is economically infeasible under the circumstances.

35. Based on the foregoing, this Order does not require the Discharger to comply with Title 27, section 20240, subdivision (c).

### **Hydrogeologic and Climate Conditions**

36. The Discharger reports that shallow groundwater in the area of the Facility occurs approximately 5 to 15 feet below ground surface, flows generally to the northwest towards the Salton Sea, has a total dissolved solids concentration ranging from approximately 1,240 to 55,000 mg/L and often contains naturally occurring heavy metals (such as arsenic) at concentrations exceeding Primary and Secondary Maximum Contaminant Levels established under title 22 of the California Code of Regulations.
37. The amount of usable near-surface groundwater in the central Imperial Valley is unknown, but this resource has not been significantly exploited because of low well yields and poor chemical quality. The upper 500 feet of fine-grained deposits in the central portion of the Imperial Valley are estimated to have a transmissivity of less than 10,000 gallons per day. Even lower permeabilities are estimated to occur at greater depths (Westec, 1981), and low vertical permeability inhibits mixing of waters from different depths, such as between the shallow aquifer system and underlying deeper groundwater that includes the geothermal resources.
38. The Facility is largely surrounded by farmland that is drained by an extensive network of ditches and drains in agricultural areas. These drains discharge into the Alamo and New Rivers, which are tributary to the Salton Sea. Canal seepage and tiled agricultural drains recharge the shallow aquifer, the Salton Sea, and even the deeper aquifer in the form of seepage from canals and irrigated agricultural lands. Groundwater in the basin is constantly being mixed with imported Colorado River water that is used for irrigating large parts of the Imperial Valley. Colorado River water is generally of a calcium-sodium chloride-sulfate type. The Colorado River is located more than 50 miles east of the Facility.
39. Climatological data obtained from 1903 to 2015 indicates an average seasonal precipitation of 3.15 inches, and an average annual pan evaporation rate greater than 100 inches.
40. The wind direction in the immediate vicinity of the Facility follows two general patterns:
  - a. Seasonally from late fall through early spring, prevailing winds are from the west and northwest. Humidity is lowest under these conditions.

- b. Summer weather patterns are often dominated by an intense, heat-induced low-pressure area that forms over the interior deserts, drawing air from the south; humidity is highest under these “monsoon” conditions.
41. Seven groundwater monitoring wells are monitored semi-annually to monitor for a release to groundwater from the Brine Ponds. Wells MWV1, MWV-2, MWV-3 and MWV-4 surround the South Pond. Well MWV-5 is approximately 150 feet east of the South Pond and 150 southeast of the North Pond. Wells MWV-6 and MWV-7 are northeast and north of the North Pond, respectively. Well MWV-5 is far enough away from both ponds to serve as a background well. The other six are in close proximity to the Brine Ponds so they can detect releases from the Brine Ponds. The location of the monitoring wells is shown on **Attachment F**, Monitoring Well Map, made part of this Order by reference.
  42. Domestic wells are not located within 500 feet of the Facility.

### **Regional Geology**

43. The Facility is located in Imperial Valley within the Salton Trough, a closed basin located below sea level and separated from the Gulf of California by the Colorado River delta. The Trough is a structural and topographic depression in the Earth’s crust that contains thousands of feet of heterogeneous Tertiary and Quaternary aged lacustrine and deltaic sediments associated with the Colorado River delta. The area is tectonically active and has numerous faults associated with the San Andreas Fault Zone. The lowest area of the basin is the Salton Sea at about 230 feet below mean sea level.
44. The Salton Trough was filled as it subsided by sediments from the Colorado River, which constructed a large transverse alluvial delta extending westward from the vicinity of Yuma, Arizona, to the western side of the Imperial Valley, effectively forming a dam across the southern end of the Salton Trough that prevented marine water from the Gulf of California from entering the basin. Thereafter, periodic diversions of the Colorado River northward into the Salton Trough (rather than flowing directly to the Gulf of California) supplied enormous volumes of water and sediments to the developing and subsiding land-locked basin. As a result, the sedimentary layers in the Salton Trough are up to 21,000 feet thick and comprised of sandstone, siltstone, and mudstones. Though individual sedimentary layers are discontinuous over long distances, internally consistent packages of sedimentary layers can be traced for miles across the geothermal well field.
45. The sedimentary sequence in the area is interpreted to encompass the Brawley and Borrego Formations, and possibly the Palm Springs Formation at great depth. The Brawley Formation, which is Pleistocene to Holocene in age, is dominated by a 1,000 to 1,300-foot-thick evaporate-bearing clay and

siltstone unit that acts as the cap rock to the geothermal reservoir. Beneath this is the Pleistocene aged Borrego Formation down to a depth of at least 5,000 to 6,000 feet.

46. The geologic materials from 1,000 to about 3,500 feet are mostly mudstones with minor associated argillaceous siltstones and lesser amounts of very fine-grained subarkosic sandstones. These sandstones, which are obviously not hydrothermally altered, are partially cemented with diagenetic calcite. The estimated intrinsic inter-granular porosity tends to decrease with depth from about 30% to less than 10%. From about 3,500 feet to about 5,000 to 6,000 feet the material is more or less subequal amounts of mudstones, siltstones and fine-grained sandstones. There is a formational change below 5,000 to 6,000 feet to dominantly fine to medium grained subarkosic sandstones with subordinate amounts of siltstone and shale. This is tentatively interpreted to be the Pleistocene to Pliocene aged Palm Springs Formation. Mafic and silicic volcanic rocks are occasionally found from 5,000 feet to below 8,000 feet.
47. The Salton Sea geothermal reservoir occurs in fractured sedimentary rocks within the Salton Trough, a structural depression on the boundary between two tectonic plates. The northwest motion of the Pacific Plate on the west, relative to the North American Plate on the east, has created regional right-lateral faults-oriented Northwest-Southeast and local conjugate left-lateral faults, oriented Northeast-Southwest. The thermal anomaly of the Salton Sea field is aligned Northeast-Southwest and appears to be centered on major left-lateral faults some of which acts as a conduit for geothermal brines upwelling from depth. Within the Salton Sea field, past volcanic activity is indicated by four outcrops of rhyolite lava (Obsidian Butte, Rock Hill, Red Island and Mullet Island), as well as rhyolite sections of volcanic rocks encountered in several wells. Due to circulating groundwater through salt-bearing beds within the Salton Trough, the geothermal brines at the Salton Sea are highly saline, with TDS in the range of 21 to 28 percent by weight. Reservoir temperatures at the Salton Sea are among the hottest of any geothermal field in the world, with encountered temperatures in excess of 700 degrees Fahrenheit.

### **Basin Plan and Other Regulatory Considerations**

48. The Water Quality Control Plan for the Colorado River Basin Region (Basin Plan) designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. Pursuant to Water Code section 13263, subdivision (a), WDRs implement the Basin Plan and take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that

purpose, other waste discharges, the need to prevent nuisance, and the provisions of Water Code section 13241.

49. The Facility is located in the Imperial Hydrologic Unit. The Basin Plan states that the beneficial uses of groundwater in the Imperial Hydrologic Unit are:
  - a. Municipal and Domestic Supply (MUN), and
  - b. Industrial Supply (IND).
  
50. Surface waters in the area of the Facility include the Imperial Irrigation District (IID) irrigation delivery canals and surface drains, the Alamo River, and the Salton Sea. The beneficial uses of surface waters in the area of the Facility are as follows:
  - a. Imperial Valley Drains
    - i. Freshwater Replenishment (FRSH),
    - ii. Water Contact Recreation (REC I),
    - iii. Non-contact Water Recreation (REC II),
    - iv. Warm Freshwater Habitat (WARM),
    - v. Wildlife Habitat (WILD), and
    - vi. Preservation of Rare, Threatened, or Endangered Species (RARE).
  
  - b. Alamo River
    - i. Freshwater Replenishment (FRSH),
    - ii. Water Contact Recreation (REC I),
    - iii. Non-Contact Water Recreation (REC II),
    - iv. Warm Freshwater Habitat (WARM),
    - v. Wildlife Habitat (WILD),
    - vi. Hydropower Generation (POW), and
    - vii. Preservation of Rare, Threatened, or Endangered Species (RARE).
  
  - c. Salton Sea
    - i. Aquaculture (AQUA),

- ii. Industrial Service Supply (IND),
  - iii. Water Contact Recreation (RECI),
  - iv. Noncontact Water Recreation (RECII),
  - v. Warm Water Habitat (WARM),
  - vi. Wildlife Habitat (WILD), and
  - vii. Preservation of Rare, Threatened, or Endangered Species (RARE).
51. This Order establishes WDRs pursuant to division 7, chapter 4, article 4 of the Water Code for discharges that are not subject to regulation under Clean Water Act section 402 (33 U.S.C. § 1342).
  52. These WDRs implement numeric and narrative water quality objectives for groundwater and surface waters established by the Basin Plan and other applicable state and federal laws and policies. The numeric objectives for groundwater designated for municipal and domestic supply (MUN) include the Maximum Contaminant Levels (MCLs) and bacteriological limits specified in California Code of Regulations, title 22, section 64421 et seq. The Basin Plan states that groundwater for use as domestic or municipal water supply (MUN) must not contain taste- or odor-producing substances in concentrations that adversely affect beneficial uses as a result of human activity.
  53. It is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This Order promotes that policy by requiring the Discharger to maintain waste containment systems that prevent discharges of waste to waters of the state.
  54. These WDRs also implement state regulations applicable to the discharge of solid/designated waste to land found in California Code of Regulations, title 27, division 2, subdivision 1, commencing with section 20005 (“Consolidated Regulations for Treatment, Storage, Processing or Disposal of Solid Waste”). These regulations contain classification criteria for wastes and for disposal sites, and prescribe minimum standards for the siting, design, construction, monitoring, and closure of waste management units.
  55. Consistent with Water Code section 13241, the Regional Water Board, in establishing the requirements contained herein, considered factors including, but not limited to, the following:
    - a. Past, present, and probable future beneficial uses of water.

- b. Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.
  - c. Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.
  - d. Economic considerations.
  - e. The need for developing housing within the region.
  - f. The need to develop and use recycled water.
56. Water Code section 13267 authorizes the Regional Water Board to require technical and monitoring reports. Monitoring and Reporting Program (MRP) R7-2022-0011 establishes monitoring and reporting requirements to implement state requirements and demonstrate compliance with this Order and to identify the Facility's impact, if any, on receiving waters. The State Water Resources Control Board's (State Water Board) electronic database, GeoTracker Information Systems, facilitates the submittal and review of facility correspondence, Discharger requests, and monitoring and reporting data. The burden, including costs, of the MRP bears a reasonable relationship to the need for the information and the benefits to be obtained from that information.
57. The discharge of waste is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge. (Wat. Code, § 13263, subd. (g).)

### **Antidegradation Analysis**

58. State Water Board Resolution 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California* (Antidegradation Policy), generally prohibits the Regional Water Board from authorizing discharges that will result in the degradation of high quality waters, unless it is demonstrated that any change in water quality will: (a) be consistent with maximum benefit to the people of the state, (b) not unreasonably affect beneficial uses, and (c) not result in water quality less than that prescribed in state and regional policies (e.g., violation of one or more water quality objectives). The discharger must also employ best practicable treatment or control to minimize the degradation of high quality waters. High quality waters are surface waters or areas of groundwater that have a baseline water quality better than required by water quality control plans and policies.
59. In accordance with Title 27, this Order requires total containment of all wastes discharged to the Brine Ponds (§ 20310, subds. (a)-(b)), and in the event of a release, corrective action (§ 20340). Compliance with these WDRs will preclude any degradation in quality of the waters of the State of California. Accordingly, this Order is consistent with the Antidegradation Policy.

### **Stormwater**

60. Federal regulations for stormwater discharges were promulgated by the U.S. Environmental Protection Agency on November 16, 1990 (40 C.F.R. parts 122, 123, and 124) to implement the Clean Water Act's stormwater program set forth in Clean Water Act section 402(p) (33 U.S.C. § 1342(p)). In relevant part, the regulations require specific categories of facilities that discharge stormwater associated with industrial activity to "waters of the United States" to obtain National Pollutant Discharge Elimination System (NPDES) permits and to require control of such pollutant discharges using Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to prevent and reduce pollutants and any more stringent controls necessary to meet water quality standards.
61. The State Water Board adopted Order 2014-0057-DWQ (NPDES No. CAS000001), *General Permit for Storm Water Discharges Associated with Industrial Activities* (Industrial General Permit), which became effective on July 1, 2015.<sup>4</sup> The Industrial General Permit regulates discharges of stormwater associated with certain industrial activities, excluding construction activities, and requires submittal of a Notice of Intent (NOI) to be covered under the permit. The Discharger indicates that it has not enrolled in the Industrial General Permit because it does not fall within the covered facilities in Attachment A.
62. The Discharger states that under normal working conditions, the capacity of the Brine Ponds and facility conveyance system is large enough to accept wastewater generated at the Facility as well as precipitation within the footprint of the Brine Ponds for a storm event with a 1000-year occurrence interval.
63. The Discharger must comply with all pertinent stormwater requirements contained in Title 27 and in this Order.

### **Financial Assurances**

64. The State Water Board-promulgated provisions of Title 27 require maintenance of appropriate financial assurance mechanisms to cover all expenses related to the Brine Ponds for the following:
  - a. Closure Activities (Cal. Code Regs., tit. 27, § 22207) – in at least the amount of the current cost estimate for closure;
  - b. Post-closure Maintenance (Cal. Code Regs., tit. 27, § 22212) – in at least the amount of the current post-closure cost estimate; and

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<sup>4</sup> As amended by Order No. 2015-0122-DWQ and Order No. 2018-0028-DWQ.

- c. Corrective Action (Cal Code Regs., tit. 27, § 22222) – for initiating and completing corrective action for all known or reasonably foreseeable corrective action.
65. Because the Discharger has an approved Preliminary Closure Plan to “clean close” the Brine Ponds (see Cal. Code Regs., tit. 27, § 21400), financial assurances are not required for post-closure maintenance. In the event the Discharger is unable to clean-close the ponds, such financial assurances will be required.
  66. **Within 90 days** following the issuance of this Order, the Discharger must provide appropriate assurances of financial responsibility for closure and for corrective action in compliance with Title 27.

### **CEQA and Public Participation**

67. These WDRs regulate the operation of an existing facility, involving negligible or no expansion of use beyond that previously existing, and is exempt from the California Environmental Quality Act (CEQA), Public Resources Code, section 21000 et seq. (See Cal. Code Regs., tit. 14, § 15301.)
68. The Regional Water Board has notified the Discharger and all known interested agencies and persons of its intent to issue waste discharge requirements for this discharge and provided them with an opportunity for a public meeting and to submit comments.
69. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to this discharge.

**IT IS HEREBY ORDERED**, pursuant to Water Code sections 13263 and 13267, that Order R7-2015-0048 is rescinded (except for enforcement purposes), and the Discharger shall comply with the following:

#### **A. Discharge Prohibitions**

1. The discharge of waste classified as “hazardous,” as defined by Title 27, section 20164 is prohibited.
2. The disposal of incompatible wastes or wastes that, when mixed or commingled with other wastes, may create heat, pressure, fire, explosion, toxic by-products, or other chemical reactions that: (1) impair the integrity of the containment structures, or (2) generate products requiring a higher level of containment than provided by the waste management unit into which the wastes are placed, is prohibited.
3. The discharge of wastewater to a location or in a manner different from that described in this Order is prohibited.

4. The discharge of waste to land not owned or controlled by the Discharger, or not authorized for such use, is prohibited.
5. The discharge of waste to the unsaturated/vadose zone or to groundwater is prohibited.
6. The discharge of waste to surface waters or surface drainage courses is prohibited.
7. The discharge of solid geothermal waste (i.e., brine particulates or precipitates) to the Brine Ponds as a final form of disposal is prohibited.
8. Domestic waste or sewage shall not be discharged to the Brine Ponds.
9. The storage, treatment, or disposal of wastes from the Facility shall not cause contamination, pollution, or nuisance as defined in Water Code section 13050, subdivisions (k), (l), and (m).

**B. Discharge Specifications**

1. The Discharger shall comply with all applicable provisions of Title 27 (Cal. Code Regs., tit. 27, § 20005 et seq.), including those not specifically referenced herein.
2. Wastes shall be discharged only into WMUs specifically designed for their containment and/or treatment, as described herein.
3. The Discharger is responsible for accurate characterization of wastes, including determinations of whether wastes will be compatible with containment features and other wastes at the WMUs, and whether the wastes are required to be managed as a “hazardous” waste or “designated” waste.
4. The discharge shall not cause the concentration of any Constituent of Concern (including Monitoring Parameters), as defined in the MRP R7-2022-0011 and incorporated herein by reference, to exceed its representative concentration limit in any monitoring medium (i.e., exceed the Water Quality Protection Standard). The concentration limit for each constituent will be set in accordance with the MRP. Data analysis shall be performed in accordance with the MRP.
5. The Discharger shall promptly notify the Regional Water Board of any slope failure occurring at the Brine Ponds. The Discharger shall promptly correct any failure which threatens the integrity of containment features or the unit in accordance with the method approved by the Regional Water Board’s Executive Officer.

6. The Discharger shall promptly remove and properly dispose of any unpermitted wastes that are discharged at the Facility in violation of these requirements.
7. Leachate collected from a waste management unit shall be discharged to the unit from which it came, or discharged to an appropriate waste management unit in accordance with Title 27, sections 20200(d) and 20340(g), and in a manner consistent with the waste classification of the liquid.
8. Discharges to the Brine Ponds shall be limited to the following waste streams:
  - a. Geothermal drilling wastes, well cleanout fluids, well-test fluids, and production-well startup fluids;
  - b. Geothermal brine and brine precipitates (solids and sludge);
  - c. Wastewater generated from plant cleanups and washdowns discharged via the conveyance system;
  - d. Cooling tower blowdown;
  - e. Portable shower effluent;
  - f. Water from hydroblasting;
  - g. Vehicle washing station effluent;
  - h. Filtrate of Brine Pond-solids dewatering that is being returned to the Brine Ponds from the filter press or other dewatering process allowed by this permit;
  - i. Lime sump effluent; and
  - j. Effluent from air emission abatement equipment.
9. At least **30 days prior** to the use of a new chemical class for control of microbes, pH, scale, and corrosion of cooling tower water and/or geothermal brine, the Discharger shall notify the Regional Water Board's Executive Officer in writing. The use of a new class of chemicals may not be utilized until approved in writing by the Regional Water Board's Executive Officer. The MRP (i.e., MRP R7-2022-0011 and subsequent revisions thereto) may be revised to incorporate the new class of chemical(s) as a monitored Constituent of Concern.
10. The Brine Ponds shall contain a leachate collection and removal system (LCRS) between the upper and lower liners.

11. The Discharger shall maintain sufficient freeboard in the Brine Ponds to accommodate seasonal precipitation and to contain a 1,000 year 24-hour storm event, but in no case no less than two (2) feet of freeboard (measured vertically).
12. Any direct-line discharge to the Brine Ponds shall have fail-safe equipment or operating procedures to prevent overflowing. Discharges shall be stopped in the event of any containment system failure which causes a threat to water quality.
13. If during the active life of the Brine Ponds, the wastes are removed and the bottom of the impoundment is cleaned down to the liner, an inspection shall be made of the bottom of the liner prior to refilling of the impoundment.
14. The LCRS shall be designed, constructed, maintained, and operated to collect and remove twice the maximum anticipated daily volume of leachate from the WMU.
15. The LCRS shall be operated to function without clogging through the scheduled closure of the Brine Ponds and during the post-closure maintenance period. The LCRS shall be tested at least annually to demonstrate proper operation. The results of the tests shall be compared with earlier tests made under comparable conditions.
16. The liquid entering the LCRS sump shall not accumulate to an extent that it extends out of the LCRS sump and into the collection portion of the LCRS. The Discharger shall remove fluids from the LCRS sump as often as needed to prevent the liquid in the LCRS from backing up into the collection portion of the LCRS.
17. LCRS maintenance and repair plans shall generally be submitted to the Regional Water Board in advance of any work. The Discharger is only authorized without prior approval to conduct ongoing, minor maintenance repairs to minimize the exposure of the liner and keep any tears from the edges of the liner from worsening. Surface impoundment repair plans and liner Construction Quality Assurance (CQA) Plans shall be developed and stamped by a licensed professional experienced in this type of work.
18. Residual solids obtained from wastewater discharged to the Brine Ponds shall be discharged only at a solid waste management facility (landfill) licensed to receive such wastes. The Discharger shall maintain legible records on the volume and type of waste removed from the Brine Ponds and shall submit a shipping manifest or other appropriate documentation showing the disposal method and location.
19. Public contact with material in the Brine Ponds shall be precluded through fences, signs, or other appropriate alternatives.

### **C. Stormwater Specifications**

1. The Brine Ponds shall be designed, constructed, operated, and maintained to limit, to the greatest extent possible, erosion, slope failure, overtopping, inundation or washout, and damage resulting from natural disasters such as: flood volumes from a 24-hour storm event having a predicted frequency of once in 1,000 years, pursuant to Title 27, section 20375; the Maximum Credible Earthquake (MCE) pursuant to section 20310, Table 4.1; and severe wind storms.
2. Surface and subsurface drainage from outside of a waste management unit shall be diverted from the unit.
3. Surface drainage from tributary areas, and internal site drainage from surface or subsurface sources, shall not contact or percolate through the wastes discharged at the Facility.
4. Diversion and drainage facilities shall be designed, constructed, and maintained to:
  - a. Accommodate the anticipated volume of precipitation and peak flows from surface runoff and under the precipitation conditions for the waste management unit.
  - b. Effectively divert sheet flow runoff laterally, via the shortest distance, into the drainage and collection facilities.
  - c. Prevent surface erosion through the use of energy dissipators, where required, to decrease the velocity of runoff, slope protection, and other erosion control measures where needed to prevent erosion.
  - d. Control and intercept run-on, in order to isolate uncontaminated surface waters from water that might have come into contact with waste.
  - e. Take into account:
    - i. For closed waste management units and for closed portions of units, the expected final contours of the closed unit, including its planned drainage pattern.
    - ii. For operating portions of waste management units other than surface impoundments, the unit's drainage pattern at any given time.

- iii. The possible effects of the waste management unit's drainage pattern on and by the regional watershed.
  - iv. The design capacity of drainage systems of downstream and adjacent properties by providing for the gradual release of retained water downstream in a manner which does not exceed the expected peak flow rate at the point of discharge if there were no waste management units or facility.
  - f. Preserve the system's function. The Discharger shall periodically remove accumulated sediment from the sedimentation or retention basins as needed to preserve the design capacity of the system.
5. Collection and holding facilities associated with precipitation and drainage control systems shall be emptied immediately following each storm or otherwise managed to maintain the design capacity of the system.

#### **D. Monitoring Specifications**

1. The Discharger shall implement the MRP (i.e., MRP R7-2022-0011 and subsequent revisions thereto) to detect at the earliest opportunity unauthorized discharges of waste constituents from the Facility, or any impairment of beneficial uses that result from discharges of waste at the Facility. The Discharger shall report the results of all onsite monitoring in accordance with the operative MRP.
2. The Discharger shall conduct a water quality monitoring and response program in accordance with the operative MRP, including:
  - a. Detection Monitoring. The Discharger shall institute a detection monitoring program pursuant to Title 27, section 20420.
  - b. Evaluation Monitoring. The Discharger shall institute an evaluation monitoring program under Title 27, section 20425:
    - i. Whenever there is "measurably significant" (as defined in section 20164) evidence of a release from the waste management unit under the detection monitoring program; or
    - ii. Whenever there is significant physical evidence of a release from the waste management unit. Significant physical evidence of a release includes unexplained volumetric changes in surface impoundments, unexplained stress in biological communities, unexplained changes in soil characteristics, visible signs of leachate migration, and unexplained water table mounding beneath or adjacent to

the unit and any other change to the environment that could reasonably be expected to be the result of a release from the unit.

- c. Corrective Action Monitoring. The Discharger shall institute a corrective action monitoring program under Title 27, section 20430 when the Regional Water Board determines that the assessment of the nature and extent of the release and the design of a corrective action program have been satisfactorily completed.

**3. Sample Collection and Analysis Plan.** Within **90 days** of the adoption of these WDRs, the Discharger shall submit, for review and approval by the Regional Water Board's Executive Officer, a comprehensive Sample Collection and Analysis Plan (SCAP) that shall describe in detail the methods to be used to perform all monitoring activities for all onsite features, including:

- a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;
- b. Sample preservation information and shipment procedures;
- c. Sample analytical methods and procedures;
- d. Sample quality assurance/quality control (QA/QC) procedures;
- e. Chain of custody control; and
- f. Sample analysis information including sample preparation techniques to avoid matrix interferences, method detection limits (MDLs), practical quantitation limits (PQLs) and reporting limits (RLs), and procedures for reporting trace results between the MDL and PQL.

Once the SCAP is approved, the Discharger may request changes to the approved SCAP, as needed, but shall use the procedures described in the approved SCAP until such changes are authorized by the Regional Water Board's Executive Officer.

**E. Corrective Action Specifications**

1. For all waste management units in a corrective action program to address a release from the unit, the Discharger shall implement all corrective measures necessary to remediate the release and to ensure that the Discharger achieves compliance with the Water Quality Protection Standard (as defined in the MRP) adopted for that unit. To confirm cleanup of all water-bearing media affected by

the release, the Discharger shall complete the demonstration required under Title 27, section 20430(g).

2. The cessation of any corrective action measure (e.g. landfill gas, leachate, and groundwater extraction) is prohibited without written approval from the Regional Water Board's Executive Officer. If routine maintenance or a breakdown results in cessation of corrective action for greater than **24 hours**, the Discharger shall notify Regional Water Board staff.
3. Following an earthquake that generates significant ground shaking (Modified Mercalli Intensity Scale V or greater) at or near the Facility, the Discharger shall submit a detailed post-earthquake inspection and corrective action plan. The plan shall address damage to and corrective measures for: containment structures; leachate control and stormwater management systems; wells and equipment to monitor groundwater; and any other system/structure potentially impacted by static and seismic deformations of the waste management unit. The Discharger shall notify the Regional Water Board Executive Officer immediately, but no later than **24 hours**, of damage to the waste management units due to an earthquake, and provide a post-earthquake inspection report within **15 business days**.

#### F. Financial Assurances Specifications

1. The Discharger shall obtain and maintain adequate assurances of financial responsibility for closure, post-closure maintenance, and corrective action for all known and reasonably foreseeable releases from a waste management unit at the Facility in accordance with Title 27, sections 20380(b) and 20950 and subchapter 2 ("Financial Assurance Requirements") of division 2, subdivision 1, chapter 6 of Title 27.
2. The Discharger shall demonstrate to the Regional Water Board that it has established acceptable financial assurance mechanisms described in subchapter 3 ("Allowable Mechanisms") of Title 27, division 2, subdivision 1, chapter 6 in at least the amount of the cost estimates for closure and corrective action approved by the Regional Water Board's Executive Officer.
3. **Corrective Action Financial Assurance.** Within **90 days** of the adoption of this Order, the Discharger shall submit to the Regional Water Board, in accordance with Title 27, section 22222, assurance of financial responsibility acceptable to the Regional Water Board's Executive Officer for initiating and completing corrective action for all known or reasonably foreseeable releases from the Brine Ponds.
4. **Closure Financial Assurance.** Within **90 days** of the adoption of this Order, the Discharger shall submit to the Regional Water Board, in accordance with Title 27, section 22207, an updated assurance of financial responsibility

acceptable to the Regional Water Board's Executive Officer for initiating and completing clean closure for the Brine Ponds.

5. **Yearly Financial Assurances Report.** The Discharger shall submit, by **June 1** of each year, a report calculating the increase in the cost estimates for closure, post-closure maintenance, and corrective action due to the inflation factor (specified in Cal. Code Regs., tit. 27, § 22236) for the previous calendar year.
6. Documents supporting the amount and active status of the required financial assurance mechanisms shall be included in the Facility's ROWD and revisions. Annual cost estimates and inflation factors shall be submitted to the Regional Water Board as an addendum to the ROWD.

#### **G. Closure and Post-Closure Specifications**

1. The Discharger shall notify the Regional Water Board in writing of the final closure or partial final closure of a waste management unit as follows:
  - a. Landfill Units. For landfill waste management units, notice shall be given either: (1) at the same time that CalRecycle is notified under California Code of Regulations, title 27, section 21110, or (2) **180 days** prior to beginning any final closure activities, whichever is sooner.
  - b. Non-Landfill Units. For non-landfill waste management units (including Class II surface impoundments), notice shall be given at least **180 days** prior to beginning any final closure activities.
  - c. Affirmation. The notice shall include a statement that all closure activities will conform to the most recently-approved final or partial final closure plan and that the plan provides for site closure in compliance with all applicable federal and state regulations.
2. The Discharger shall carry out closure of a waste management unit or portion of a waste management unit in accordance with a closure and post-closure maintenance plan approved by the Regional Water Board (Cal. Code Regs., tit. 27, §§ 20950(a)(1), 21769(d)) through the issuance of closure WDRs.

#### **H. Special Provisions**

1. **Spill Prevention Plan.** Within **90 days** of the adoption of this Order, the Discharger shall submit the Spill Prevention Plan for approval by the Regional Water Board's Executive Officer. The Discharger shall develop and implement a plan for immediate detection of leaks or failures in the aboveground pipelines carrying geothermal fluids. If an automatic pump is being used, an alarm or shutoff device shall be installed on the pump used in the pipelines. Pumping of

geothermal fluids shall be suspended immediately following major pipeline failure. The plan shall include routine inspection of the entire length of the aboveground line in operation at the time, and the maintenance of an inspection log. Minor leaks shall be repaired immediately upon being identified. A sign should be posted to identify the fluid being pumped and alerting the public of the potential danger.

2. **Geothermal Brine Spill Reporting.** If leaks or failures in the aboveground pipelines carrying geothermal solution occur in excess of 150 gallons, or if there is any spill of geothermal fluid from the Brine Ponds, the Discharger shall do the following:
  - a. Orally report to the Regional Water Board office and the Office of Emergency Services within **24 hours** of when the Discharger becomes aware of the incident. If noncompliance occurs outside of business hours, the Discharger shall leave a message on the Regional Water Board's office voicemail.
  - b. Provide a written report within **five business days** of the time the Discharger becomes aware of the incident. The written report shall contain a description of the noncompliance and its cause, the period of noncompliance, the anticipated time to achieve full compliance, and the steps taken or planned, to reduce, eliminate, and prevent recurrence of the noncompliance. The Discharger shall estimate the total volume as well as the vertical and horizontal extent of the spill/leak/release.
  - c. Submit a follow-up report within **30 days** of receipt of final test results that includes **confirmation sampling results** indicating that cleanup goals have been achieved.

## I. Standard Provisions

1. **Noncompliance.** The Discharger shall comply with all of the terms, requirements, and conditions of this Order and MRP R7-2022-0011. Noncompliance is a violation of the Porter-Cologne Water Quality Control Act (Water Code, § 13000 et seq.) and grounds for: (1) an enforcement action; (2) termination, revocation and reissuance, or modification of these WDRs; or (3) denial of an Order renewal application.
2. **Enforcement.** The Regional Water Board reserves the right to take any enforcement action authorized by law. Accordingly, failure to timely comply with any provisions of this Order may subject the Discharger to enforcement action. Such actions include, but are not limited to, the assessment of administrative civil liability pursuant to Water Code sections 13323, 13268, and 13350, a Time Schedule Order (TSO) issued pursuant to Water Code section 13308, or referral to the California Attorney General for recovery of judicial civil liability.

- 3. Proper Operation and Maintenance.** The Discharger shall at all times properly operate and maintain all systems and components of collection, treatment, and control installed or used by the Discharger to achieve compliance with this Order. Proper operation and maintenance includes, but is not limited to, effective performance, adequate process controls, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities/systems when necessary to achieve compliance with this Order. All systems in service or reserved shall be inspected and maintained on a regular basis. Records of inspections and maintenance shall be retained and made available to the Regional Water Board on request.
- 4. Reporting of Noncompliance.** The Discharger shall report any noncompliance that may endanger human health or the environment. Information shall be provided orally to the Regional Water Board office and the Office of Emergency Services within 24 hours of when the Discharger becomes aware of the incident. If noncompliance occurs outside of business hours, the Discharger shall leave a message on the Regional Water Board's office voicemail. A written report shall also be provided within five (5) business days of the time the Discharger becomes aware of the incident. The written report shall contain a description of the noncompliance and its cause, the period of noncompliance, the anticipated time to achieve full compliance, and the steps taken or planned, to reduce, eliminate, and prevent recurrence of the noncompliance. All other forms of noncompliance shall be reported with the Discharger's next scheduled Self-Monitoring Reports (SMRs), or earlier if requested by the Regional Water Board's Executive Officer.
- 5. Duty to Mitigate.** The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment.
- 6. Material Changes.** Before initiating a new discharge or making a material change in the character, location, or volume of an existing discharge, the Discharger shall report all pertinent information in writing to the Regional Water Board, and if required by the Regional Water Board, obtain revised requirements before any modifications are implemented. A material change includes, but is not limited to, the following:

  - a. An increase in area or depth to be used for solid waste disposal beyond that specified in waste discharge requirements;
  - b. A significant change in disposal method, location, or volume (e.g., change from land disposal to land treatment);
  - c. A change in the type of waste being accepted for disposal; or

- d. A change to previously-approved liner systems or final cover systems that would eliminate components or reduce the engineering properties of components.
7. **Familiarity with Order.** The Discharger shall ensure that all site-operating personnel are familiar with the content of this Order and maintain a copy of this Order at the site.
8. **Inspection and Entry.** The Discharger shall allow the Regional Water Board, or an authorized representative, upon presentation of credentials and other documents as may be required by law, to:
  - a. Enter the premises regulated by this Order, or the place where records are kept under the conditions of this Order;
  - b. Have access to and copy, at reasonable times, records kept under the conditions of this Order;
  - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
  - d. Sample or monitor at reasonable times, for the purpose of assuring compliance with this Order or as otherwise authorized by the Water Code, any substances or parameters at this location.
9. **Change in Ownership.** This Order is not transferable to any person without written approval by the Regional Water Board's Executive Officer. Prior to any change in ownership of this operation, the Discharger shall notify the Regional Water Board's Executive Officer in writing at least 30 days in advance. The notice must include a written transfer agreement between the existing owner and the new owner. At a minimum, the transfer agreement must contain a specific date for transfer of responsibility for compliance with this Order and an acknowledgment that the new owner or operator is liable for compliance with this Order from the date of transfer. The Regional Water Board may require modification or revocation and reissuance of this Order to change the name of the Discharger and incorporate other requirements as may be necessary under the Water Code.
10. **Monitoring Wells.** The Discharger shall comply with all notice and reporting requirements of the California Department of Water Resources and with any well permitting requirements imposed by a local agency regarding the construction, alteration, destruction, maintenance, or abandonment of any monitoring wells used for compliance with this Order and the accompanying MRP, as required under Water Code sections 13750 and 13755 and local agency requirements.

- 11. Format of Technical Reports.** The Discharger shall furnish, under penalty of perjury, technical monitoring program reports, and such reports shall be submitted in accordance with California Code of Regulations, title 23, division 3, chapter 30, as groundwater raw data uploads electronically over the Internet into the State Water Board's [GeoTracker](#) database. Documents that were formerly mailed by the Discharger to the Regional Water Board, such as regulatory documents, narrative monitoring reports or materials, and correspondence, shall be uploaded into GeoTracker in the appropriate Microsoft Office software application format, such as Word or Excel files, or as a Portable Document Format (PDF) file. Large documents must be split into appropriately-labelled, manageable file sizes and uploaded into GeoTracker.
- 12. Qualified Professionals.** In accordance with Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of California registered professionals (i.e., civil engineer, engineering geologist, geologist, etc.) competent and proficient in the fields pertinent to the required activities. All technical reports required under this Order that contain work plans, describe the conduct of investigations and studies, or contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall contain a statement of qualifications of the responsible licensed professional(s) as well as the professional's signature and/or stamp of the seal. Additionally, all field activities are to be conducted under the direct supervision of one or more of these professionals.
- 13. Certification Under Penalty of Perjury.** All technical reports required in conjunction with this Order shall include a statement by the Discharger, or an authorized representative of the Discharger, certifying under penalty of perjury under the laws of the State of California, that the reports were prepared under his or her supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted, and that based on his or her inquiry of the person or persons who manage the system, the information submitted is, to the best of his or her knowledge and belief, true, complete, and accurate.
- 14. Violation of Law.** This Order does not authorize violation of any federal, state, or local laws or regulations.
- 15. Property Rights.** This Order does not convey property rights of any sort, or exclusive privileges, nor does it authorize injury to private property or invasion of personal rights.

- 16. Modification, Revocation, Termination.** This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for an Order modification, rescission, or reissuance, or the Discharger's notification of planned changes or anticipated noncompliance, does not stay any Order condition. Causes for modification include, but are not limited to, the violation of any term or condition contained in this Order, a material change in the character, location, or volume of discharge, a change in land application plans or sludge use/disposal practices, or the adoption of new regulations by the State Water Board, Regional Water Board (including revisions to the Basin Plan), or federal government.
- 17. Severability.** The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of these requirements shall not be affected.

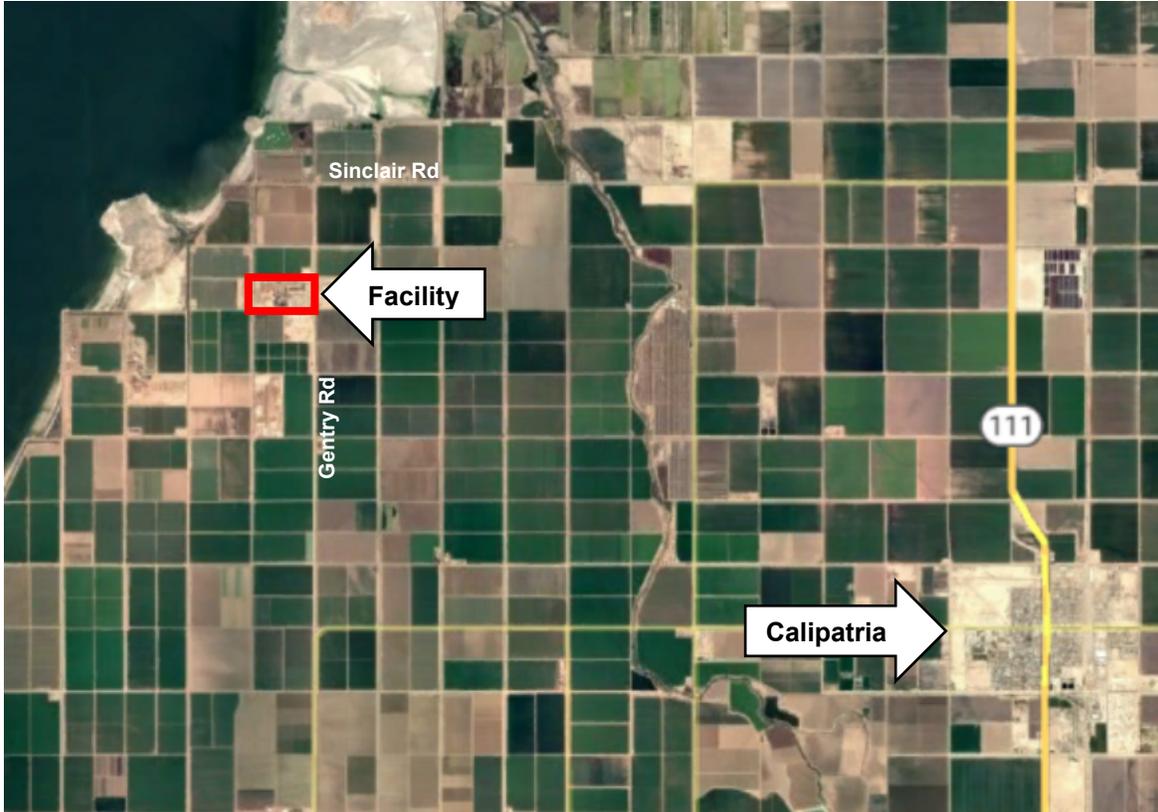
Any person aggrieved by this Regional Water Board action may petition the State Water Board for review in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 et seq. The State Water Board must receive the petition by 5:00 p.m. on the 30<sup>th</sup> day after the date of this Order; if the 30<sup>th</sup> day falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the statutes and regulations applicable to filing petitions are available on the State Water Board's website and can be provided upon request.

#### **Order Attachments**

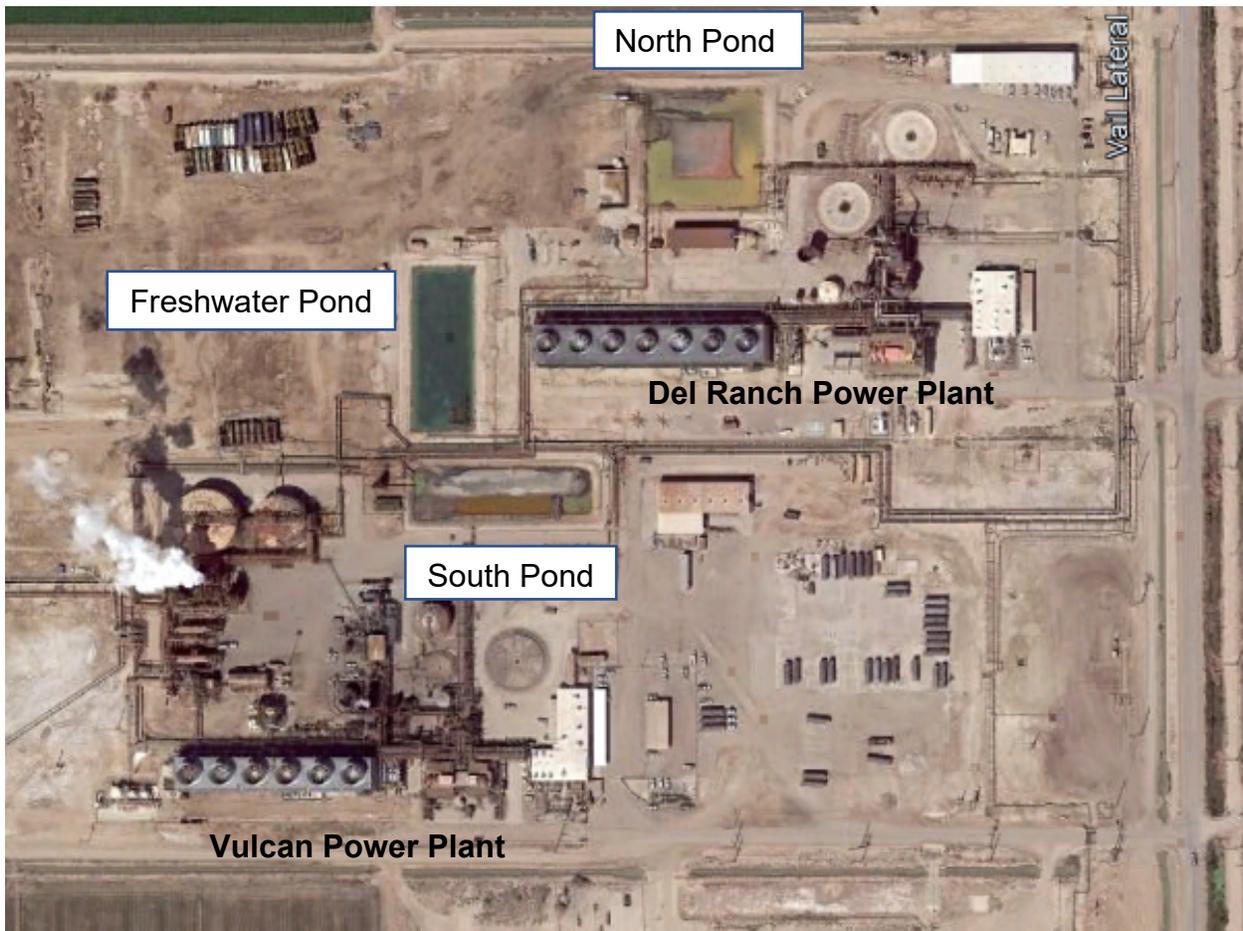
Attachment A—Facility Location Map  
Attachment B—General Facility Map  
Attachment C—Geothermal Solids Management Schematic  
Attachment D—Schematic of Additional Filter Press at Ponds  
Attachment E—Schematic of Filter System at Edge of Ponds  
Attachment F—Monitoring Well Map

#### **Monitoring and Reporting Program R7-2022-0011**

**ATTACHMENT A—FACILITY LOCATION MAP**

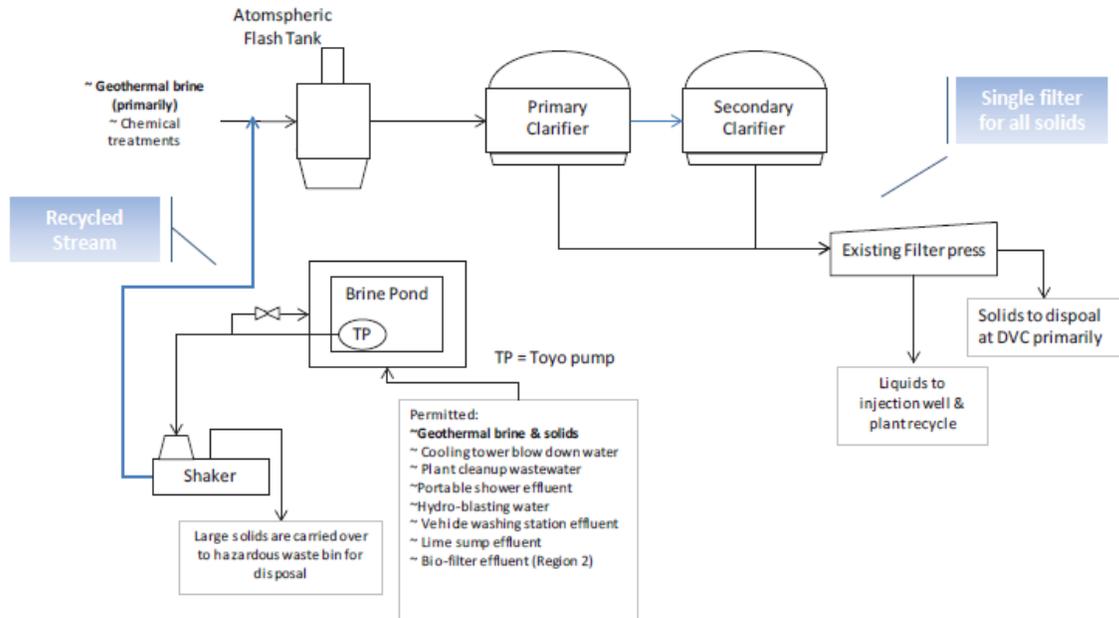


**ATTACHMENT B—GENERAL FACILITY MAP**



### ATTACHMENT C—GEOHERMAL SOLIDS MANAGEMENT SCHEMATIC

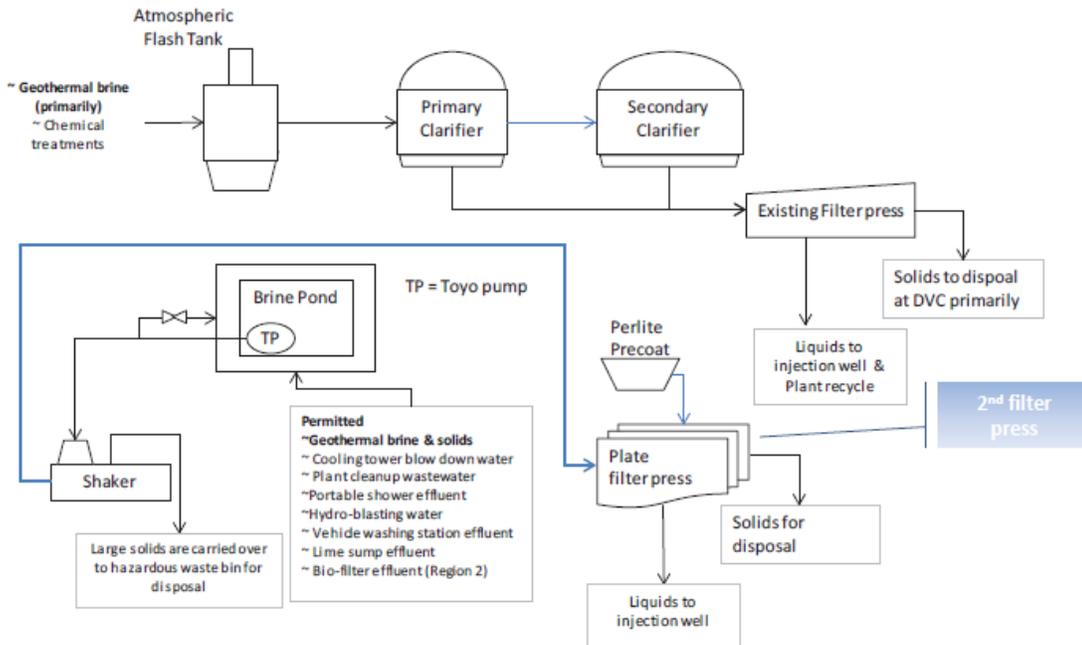
Figure 1, Brine pond Solids management:  
Toyo pump operation



Brine pond material is currently recycled to the process & solids exit the process through the existing filter press operation.

### ATTACHMENT D—SCHEMATIC OF ADDITIONAL FILTER PRESS AT PONDS

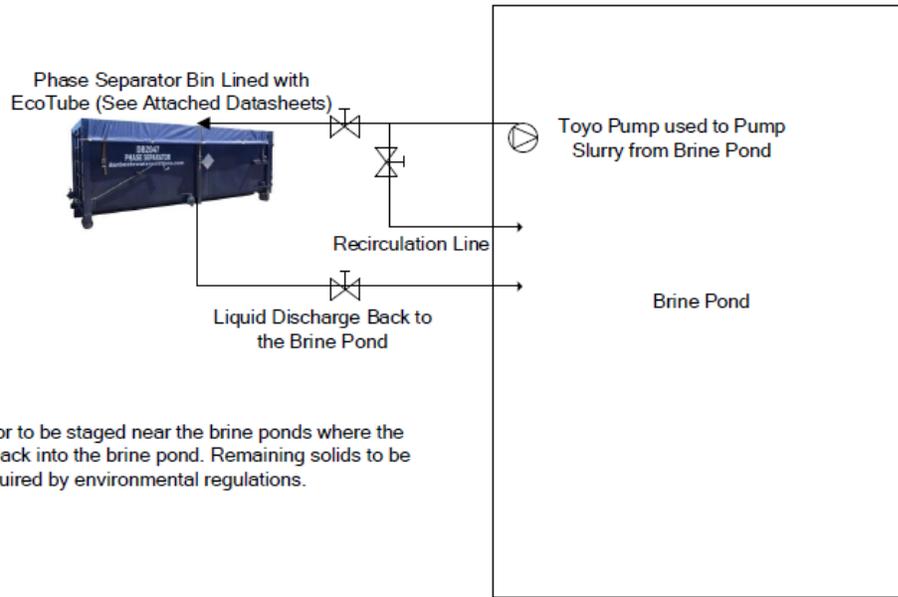
Figure 2, Brine pond Solids management: Plate Filter Press



Brine pond material can also be sent to portable plate filter press

## ATTACHMENT E—SCHEMATIC OF FILTER SYSTEM AT EDGE OF PONDS

### Brine Pond Solids Management



\*Phase separator to be staged near the brine ponds where the liquid can flow back into the brine pond. Remaining solids to be disposed as required by environmental regulations.

### ATTACHMENT F—MONITORING WELL MAP



⊕ Approximate Location of Monitoring Well

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION

**MONITORING AND REPORTING PROGRAM R7-2022-0011**  
FOR  
CALENERGY OPERATING CORPORATION, OWNER  
VULCAN BN GEOTHERMAL POWER COMPANY AND  
MAGMA POWER COMPANY, OPERATORS  
“REGION 2” VULCAN AND DEL RANCH POWER PLANTS  
CLASS II SURFACE IMPOUNDMENTS  
IMPERIAL COUNTY

This Monitoring and Reporting Program (MRP) is issued pursuant to Water Code section 13267 and incorporates requirements for groundwater, surface water, and special monitoring provisions relating to individual waste management units (WMUs). Monitoring requirements in this MRP are necessary to determine if the Region 2 (Vulcan and Del Ranch) geothermal power plants (Facility) are in compliance with Waste Discharge Requirements (WDRs) Order R7-2022-0011 (Order) and to ensure early detection of any releases of waste constituents from the Facility. The Discharger shall not implement any changes to this MRP unless a revised MRP is issued by the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Water Board) or its Executive Officer.

**PART I: SAMPLING AND ANALYSIS GENERAL REQUIREMENTS**

**A. Sampling and Analysis General Requirements**

1. As provided in Monitoring Specification D.3 of the Order, the Discharger shall submit a Sample Collection and Analysis Plan (SCAP) that incorporates the standard monitoring provisions below and describes the sampling and analysis protocols to be used for all monitoring activities. The SCAP must be received by the Regional Water Board within 90 days of adoption of the Order and this MRP.
2. Once the SCAP is approved, the Discharger may request changes to the approved SCAP, as needed, but shall use the procedures described in the approved SCAP until such changes are authorized by the Regional Water Board's Executive Officer.

**B. Standard Monitoring Provisions**

1. **Analytical Methods.** Specific methods of analysis for monitored waste constituents shall be identified in the SCAP. If the Discharger proposes to use methods other than those in the latest edition of the U.S. Environmental Protection Agency's (USEPA) *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium (SW-846)* or *Guidelines Establishing*

*Test Procedures for Analysis of Pollutants*, 40 Code of Federal Regulations part 136, the SCAP must explain the rationale for the change. The change must be approved by the Regional Water Board's Executive Officer prior to use.

2. **Monitoring Test Procedures.** The collection, preservation, and holding times of all samples shall be in accordance with protocols included in USEPA's SW-846 or 40 Code of Federal Regulations part 136, or as otherwise approved by the Regional Water Board. The Regional Water Board may, in its discretion, require methods more sensitive than those specified by USEPA.
3. **30-Day Sample Procurement Limitation.** For any given monitored medium, the samples collected from all monitoring points and background monitoring points to satisfy the data analysis requirements for a given reporting period shall all be collected within a span not to exceed 30 days, unless a longer time period is approved by the Regional Water Board's Executive Officer, and shall be collected in a manner that ensures sample independence to the greatest extent feasible. The 30-day limit does not apply to media that (1) are resampled to confirm the results of the initial round of samples, or (2) are resampled due to errors in the original sampling and analysis, but the Discharger shall conduct the resampling as expeditiously as practical.
4. **Laboratory Certification.** Unless otherwise approved by the Regional Water Board's Executive Officer, all analyses shall be conducted by a laboratory certified by the State Water Resources Control Board (State Water Board), Division of Drinking Water's Environmental Laboratory Accreditation Program (ELAP).
5. **Reporting Levels.** All analytical data shall be reported with method detection limits (MDLs) and with either the reporting level or limits of quantitation (LOQs) according to 40 Code of Federal Regulations part 136, Appendix B. The laboratory reporting limit for all reported monitoring data shall be no greater than the practical quantitation limit (PQL).
6. **QA/QC Data.** All quality assurance / quality control (QA/QC) data shall be reported, along with the sample results to which they apply, including the method, equipment, and analytical detection limits, the recovery rates, an explanation of any recovery rate that is less than 80%, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analyses, and the name and qualifications of the person(s) performing the analyses. Sample results shall be reported unadjusted for blank results or spike recovery. In cases where contaminants are detected in QA/QC samples (i.e., field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged, but the analytical results shall not be adjusted.

- 7. Instrumentation and Calibration.** All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated, as necessary, to ensure their continued accuracy. If continuous monitoring equipment is out of service for a period greater than 24 hours, the Discharger shall obtain representative grab samples each day the equipment is out of service. The Discharger shall correct the cause(s) of failure of the continuous monitoring equipment as soon as practicable. The Discharger shall report the period(s) during which the equipment was out of service and if the problem has not been corrected, shall identify the steps which the Discharger is taking or proposes to take to bring the equipment back into service and the schedule for these actions.
- 8. Field Test Instruments.** Field test instruments (such as those used to test pH, dissolved oxygen, and electrical conductivity) may be used provided that:

  - a. The user is trained in proper use and maintenance of the instruments,
  - b. The instruments are field calibrated prior to monitoring events at the frequency recommended by the manufacturer,
  - c. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency, and
  - d. Field calibration reports are submitted.
- 9. Records Retention.** The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, for a minimum of five years from the date of the sampling or measurement. This period may be extended by request of the Regional Water Board's Executive Officer at any time. Records of monitoring information shall include:

  - a. The date, exact place, and time of sampling or measurement(s);
  - b. The individual(s) who performed the sampling or measurement(s);
  - c. The methods used for groundwater purging/sampling;
  - d. The date(s) analyses were performed;
  - e. The individual(s) who performed the analyses;
  - f. The analytical techniques or method used; and
  - g. All sampling and analytical results, including:

- i. units of measurement used,
- ii. minimum reporting limit for the analyses,
- iii. results less than the reporting limit but above the method detection limit (MDL),
- iv. data qualifiers and a description of the qualifiers,
- v. quality control test results (and a written copy of the laboratory quality assurance plan),
- vi. dilution factors, if used, and
- vii. sample matrix type.

## **PART II: SITE-SPECIFIC MONITORING REQUIREMENTS**

This part describes the site-specific monitoring program requirements to be implemented for the Facility and is organized by the type of monitoring to be performed. The methods used shall be as described in the approved SCAP.

The site-specific monitoring program of this MRP includes:

**Table 1. Summary of Site-Specific Monitoring**

Section	Monitoring Program
A	Groundwater Monitoring
B	Unsaturated/Vadose Zone Monitoring
C	Surface Water Monitoring
D	Surface Impoundment Monitoring
F	Evaluation Monitoring
G	Corrective Action Monitoring

### **A. Groundwater Monitoring**

The Discharger shall operate and maintain a groundwater monitoring system that complies with the applicable provisions of California Code of Regulations, title 27, sections 20415 and 20420. Monitoring shall be performed in accordance with the locations, frequencies, and parameters described below:

#### **1. Monitoring Well Locations**

One well (MWV-5) is located several hundred feet away from the Brine Ponds and is considered a background monitoring point. The other monitoring wells are used for detection monitoring. The groundwater monitoring network shall consist

of the following monitoring wells and any new monitoring wells added at the Facility (as approved by the Regional Water Board's Executive Officer):

**Table 2. Monitoring Wells Summary**

Well	Location	Status	Frequency
MWV-1	South Pond	Detection	Semi-Annually
MWV-2	South Pond	Detection	Semi-Annually
MWV-3	South Pond	Detection	Semi-Annually
MWV-4	South Pond	Detection	Semi-Annually
MWV-5	Eastern portion of Facility	Background	Semi-Annually
MWV-6	North Pond	Detection	Semi-Annually
MWV-7	North Pond	Detection	Semi-Annually

## 2. Parameters/Constituents Monitored

Groundwater samples shall be collected from the detection monitoring wells and any additional wells added as part of the approved groundwater monitoring system. The collected samples shall be analyzed for the Monitoring Parameters and Constituents of Concern specified below in accordance with the specified methods and frequencies.

"Monitoring Parameters" and "Constituents of Concern" shall have the meaning specified in California Code of Regulations, title 27, section 20164. "Monitoring Parameters" means the group of constituents specified below and includes physical parameters, waste constituents, reaction products, and hazardous constituents that provide a reliable indication of a release from a waste management unit. "Constituents of Concern" (COCs) include a larger group of waste constituents and mean any waste constituents, reaction products, and hazardous constituents reasonably expected to be in or derived from waste contained in a waste management unit.

Various Constituents of Concern are included as Monitoring Parameters, although the full list of Constituents of Concern are not included as Monitoring Parameters and need only be sampled for once every 5 years, as specified below.

### a. Monitoring Parameters

"Monitoring Parameters" shall consist of the (1) Field Monitoring Parameters and (2) Laboratory Monitoring Parameters specified below:

- i. Field Monitoring Parameters – During each groundwater monitoring event,<sup>5</sup> the following field parameters shall be measured:

**Table 3. Field Parameters Monitoring**

Parameter	Unit
pH	pH units
Depth to groundwater	Feet Below Elevation Datum
Depth to the bottom of the well	Feet Below Elevation Datum
Groundwater density	Kg/L
Groundwater elevation <sup>6</sup>	Feet above sea level (USGS Datum)
Specific conductance	Micromhos/cm
Temperature	Degrees F
Turbidity	Nephelometric Turbidity Units (NTU)
Dissolved oxygen	Milligrams per liter (mg/L) and percent saturation
Oxidation-Reduction Potential (ORP)	Millivolts (mV)

- ii. Laboratory Monitoring Parameters – Twice per year (semi-annually), groundwater samples shall be analyzed at a laboratory for the following constituents (at a minimum):

**Table 4. Laboratory Monitoring Parameters Monitoring**

Constituents	Units	Sample Type	Reporting Freq.
Total Dissolved Solids (TDS)	mg/L	Grab	Semi-Annually
Arsenic	µg/L	Grab	Semi-Annually
Barium	µg/L	Grab	Semi-Annually
Cadmium	µg/L	Grab	Semi-Annually
Lead	µg/L	Grab	Semi-Annually
Zinc	µg/L	Grab	Semi-Annually
Oil & Grease	mg/L	Grab	Semi-Annually

- b. **Additional Constituents of Concern, Required Every Five Years (5-Year COCs)**

<sup>5</sup> Pursuant to Cal. Code Regs., tit. 27, § 20415(e)(13).

<sup>6</sup> Semi-annual measurement of groundwater elevations is approved pursuant to title 27, section 20380(e), allowing engineered alternatives provided they achieve the goals of the monitoring program.

In addition to the Monitoring Parameters listed above, the groundwater shall be analyzed at a laboratory every five years, with the next monitoring event to be performed in the second half of 2022, and alternating between the two monitoring episodes for each five-year reporting period thereafter, for the following 5-Year COCs (and any additional COCs required by the Regional Water Board's Executive Officer):

**Table 5. List of 5-Year COCs**

Constituent
1. Alkalinity
2. General Chemistry (Ca, Mg, Na, K, SO <sub>4</sub> , Cl, HCO <sub>3</sub> )
3. Carbonate (CO <sub>3</sub> )
4. Total Petroleum Hydrocarbons
5. 17 Heavy Metals (Cal. Code Regs., tit. 22, § 66261.24 / CAM 17)
6. (Removed)
7. Semi-Volatile Organic Compounds (USEPA Method 8270)
8. Volatile Organic Compounds (USEPA Method 8260)

The results of the 5-Year COC sampling shall be reported in the Annual Monitoring Report for the year in which the samples were collected.

Note that the broader term "COCs" includes both the Monitoring Parameters and 5-Year COCs.

**B. Unsaturated Zone Monitoring**

There is no unsaturated/vadose zone action monitoring program required at this time.

**C. Surface Water Monitoring**

Perennial streams are not located at the Facility and the occurrence of surface water should be limited to (1) immediately after significant storm events, and (2) if seeps develop along the perimeter of a waste management unit.

1. **Observed Surface Water Monitoring.** If surface water is observed near a waste management unit, the source of the surface water shall be identified, and observations of the following shall be included in the next Semi-Annual Monitoring Report:
  - a. Flow rate and source of water;
  - b. Floating and suspended materials of waste origin: Presence or absence, source, and size of affected area;

- c. Discoloration and turbidity: Description of color, source, and size of affected area;
- d. Evidence of odors: Presence or absence, characterization, source, and distance of travel from source; and
- e. Weather conditions: Wind direction and estimated velocity, total precipitation during the previous five (5) days and on the day of observation.

**2. Seep Monitoring.** If a seep is identified in proximity to a waste management unit:

- a. The location, flow rate, and other characteristics (such as color and odor) shall be orally reported to the Regional Water Board within **48 hours**, and a written report concerning the seep shall be submitted to the Regional Water Board **within seven (7) days**.
- b. Flow from the seep shall be contained to preclude the seep from adversely affecting surface waters.
- c. A sample of the seepage shall be collected and tested for the Field Monitoring Parameters described in Part II.A.2.a.I.
- d. If the Field Monitoring Parameters indicate the seepage is not groundwater, or if it is unlikely the source of the seep is groundwater, the sample shall be analyzed for the Monitoring Parameters and 5-Year COCs described in Part II.A.2.a and b.
- e. The results of all testing shall be reported to the Regional Water Board **within seven (7) days** of receipt of the written laboratory report.
- f. Seeps that continue to exist for more than one reporting period shall be monitored during each reporting period and the results shall be included in the Semi-Annual Monitoring Report.

**D. Surface Impoundment Monitoring**

**1. Pond Capacity Monitoring**

The Brine Ponds shall be monitored at least monthly and included in the Semi-Annual Monitoring Report for the following:

- a. The available freeboard in each pond and/or pond cell.
- b. The average monthly volume and maximum monthly volume of wastewater and/or freshwater discharged into the surface impoundments in gallons.

- c. The average daily volume and maximum daily volume of wastewater and/or freshwater removed from the surface impoundments in gallons.
- d. Observations of erosion, settlement, and/or subsidence along the visible areas of the surface impoundment(s), including the top of the berm, outer slopes, and upper region of the inner slope. Repairs shall be performed as needed and documented in the inspection logs.

**2. Geothermal Solids Monitoring – Brine Ponds Only**

When solid geothermal waste is removed from the Brine Ponds for final disposal at a proper facility, the solid waste shall be monitored and sampled for the following, and the information shall be included in each Semi-Annual Monitoring Report:

**Table 6. Geothermal Solids Monitoring**

Parameter	Unit	Reporting Frequency	Monitoring Frequency
Volume of solids removed	Tons	Semi-Annually	Monthly
Location of final disposal	Facility Name	Semi-Annually	Monthly
Volume of solids/liquids contained	Gallons	Semi-Annually	Monthly

**Table 7. Geothermal Solids Sampling**

Constituents	Units	Sample Type	Reporting Freq.
Arsenic	µg/kg	Grab	Semi-Annually

Constituents	Units	Sample Type	Reporting Freq.
Barium	µg/kg	Grab	Semi-Annually
Cadmium	µg/kg	Grab	Semi-Annually
Lead	µg/kg	Grab	Semi-Annually
Zinc	µg/kg	Grab	Semi-Annually

### 3. Geothermal Wastewater Monitoring – Brine Ponds Only

- a. Samples of wastewater shall be collected from the Brine Ponds and analyzed for the following:

**Table 8. Class II Surface Impoundment Monitoring**

Constituents	Units	Sample Type	Reporting Freq.
pH	mg/L	Composite	Semi-Annually
Total Dissolved Solids	mg/L	Composite	Semi-Annually
Specific Conductance	mg/L	Composite	Semi-Annually
Arsenic	µg/L	Grab	Semi-Annually
Barium	µg/L	Grab	Semi-Annually
Cadmium	µg/L	Grab	Semi-Annually
Lead	µg/L	Grab	Semi-Annually
Zinc	µg/L	Grab	Semi-Annually
General Chemistry (Ca, Mg, Na, K, SO <sub>4</sub> , Cl, HCO <sub>3</sub> )	mg/L	Composite	Annually
Carbonate (CO <sub>3</sub> )	mg/L	Composite	Annually
Total Alkalinity	mg/L	Composite	Annually

### 4. LCRS Monitoring

- a. The LCRSs must be designed and operated to function without clogging through the scheduled closure of the waste management unit and during any post-closure maintenance period. The Discharger shall test each LCRS annually pursuant to California Code of Regulations, title 27, section 20340(d) to demonstrate proper operation. Except for the first annual test, the results of this

testing shall be compared to earlier tests made under comparable conditions.

- b. If LCRS has a high-water alarm system that is functioning properly, the Facility shall monitor the height of liquid in each LCRS sump at least **quarterly** to an accuracy of one-quarter (1/4) inch. If the alarm system is not functioning properly, the frequency of this monitoring shall be **weekly**. The Discharger shall record the data in the monitoring logs and include the data in the Semi-Annual Monitoring Report.
- c. The Discharger shall measure the electrical conductivity and pH of any liquid in the sumps **quarterly**.
- d. The Discharger shall remove fluids from the LCRS sumps as often as needed to prevent the liquid in the sump from backing up into the collection portion of the LCRS. The removed liquid may be discharged back into the surface impoundment for that sump. The volume removed shall be measured and used to identify the leakage rate into each sump. The removal dates, volumes, and calculated leakage rates shall be included in the Semi-Annual Monitoring Report.
- e. If an automated sump-pump is installed, an alarm shall also be installed to indicate if the sump fills beyond the upper limit of the sump-pump settings. Automated systems shall also include a means of monitoring changes in the height of liquid in the sump and measuring the frequency and volume of pumping. This data shall be converted to a daily leakage rate and summarized in the Semi-Annual Monitoring Report. Automated sump pumps shall be tested at least annually to ensure they are functioning properly.
- f. If leakage rates exceed the reporting threshold (RT), the Discharger shall follow the steps in Part II.E.3 – Excessive Leachate Production. The RT for this Facility shall be the accumulation of 300 gallons of water in a single sump within a 24-hour period.
- g. A workplan describing proposed changes to the LCRS monitoring system shall be submitted to the Regional Water Board for review and approval prior to implementing any proposed changes.

## E. Evaluation Monitoring

### 1. Notification of a Release

Should the Discharger discover a release from the Facility, the Discharger shall:

- a. Initial Notification. Notify the Regional Water Board by phone or e-mail **within 24 hours**, and by mail **within seven days**, when the Discharger determines from monitoring results that there is measurably significant evidence of a release. (Cal. Code Regs., tit. 27, § 20420(j)(1).)
- b. Retest. The Discharger may immediately initiate the verification procedure specified in Part III.B.3 to verify that there is “measurably significant” evidence of a release of particular constituent.<sup>7</sup> (Cal. Code Regs., tit. 27, § 20420(j)(2).)
- c. Notice to Nearby Landowners. The Discharger shall, **within 14 days** of confirming measurably significant evidence of a release, notify all persons who own the land or reside on the land that directly overlies any portion of the plume of contamination, if sampling of detection monitoring wells indicates contaminants have migrated off-site. (40 C.F.R. § 258.55(g)(1)(iii).)

### 2. Evaluation of a Release

If the Discharger determines that a previously unknown release from the Facility has occurred, the following actions shall be taken:

- a. Non-Statistical COC Scan. If the detection was made based upon sampling and analysis for Monitoring Parameters, the Discharger shall immediately sample all monitoring points in the affected medium at that waste management unit and determine the concentration of all Monitoring Parameters and Constituents of Concern for comparison with established concentration limits. Because this scan does not involve statistical testing, the Discharger will only need to collect and analyze a single water sample from each monitoring point in the affected medium. (Cal. Code Regs., tit. 27, § 20420(k)(1).)
- b. Amended ROWD for Evaluation Monitoring Program (EMP). The Discharger shall, **within 90 days** of confirming a measurably significant evidence of a release, submit an amended Report of Waste Discharge (ROWD) proposing an evaluation monitoring program that meets the

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<sup>7</sup> Under California Code of Regulations, title 27, section 20420(k)(7), the Discharger may also demonstrate that a source other than the waste management unit caused the release.

requirements of California Code of Regulations, title 27, sections 20420(k)(5) and 20425. The evaluation monitoring program shall be designed for the collection and analysis of all data necessary to assess the nature and extent of the release and to determine the spatial distribution and concentration of each constituent throughout the zone affected by the release. (Cal. Code Regs., tit. 27, §§ 20420(k)(5) and 20425(b).) For releases from municipal solid waste (MSW) landfill units, the evaluation monitoring program shall also include any additional proposals necessary to comply with 40 C.F.R. § 258.55, particularly the additional monitoring wells required by 40 C.F.R. § 258.55(g)(1)(ii). Additionally, the Discharger shall add any 5-Year COC for which there is a confirmed measurably significant release to the list of Monitoring Parameters.

- c. Preliminary Engineering Feasibility Study (EFS). The Discharger shall, **within 180 days** of confirming a measurably significant evidence of a release, submit to the Regional Water Board a preliminary engineering feasibility study (EFS) report for a corrective action program that meets the requirements of California Code of Regulations, title 27, sections 20420(k)(6) and 20430. At a minimum, the feasibility study shall contain a detailed description of the corrective action measures that could be taken to achieve background concentrations for all COCs.
- d. Additional EMP Required Actions. The Discharger shall, **within 90 days** of establishing an evaluation monitoring program (i.e., from the date of Regional Water Board approval of the program), complete and submit the following:
  - i. A report with the results and assessment/delineation of the release based on the approved evaluation monitoring program. (Cal. Code Regs, tit. 27 § 20425(b).)
  - ii. An updated engineering feasibility study for corrective action based on the data collected to delineate the release and data from the ongoing monitoring program required under title 27, section 20425(e). (Cal. Code Regs., tit. 27, § 20425(c).)
  - iii. An amended ROWD to establish a corrective action program meeting the requirements of title 27, section 20430 based on the data collected to delineate the release and based on the updated engineering feasibility study. (Cal. Code Regs., tit. 27, § 20425(d).)<sup>8</sup>

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<sup>8</sup> The Discharger shall (for releases from MSW landfill units) discuss the results of the updated engineering feasibility study, prior to the final selection of a remedy, in a public meeting with interested and affected parties. (40 C.F.R. § 258.56(d).)

### 3. Excessive Leachate Production

- a. If leakage rates in any LCRS exceed the reporting threshold (RT) of 300 gallons per day, the Discharger shall report this to the Regional Water Board within **48 hours** and propose further actions to evaluate whether repairs are needed. Unless a Facility-specific RT is approved by the Regional Water Board, the default RT shall be one half of the volume of the sump per day.
- b. The first time liquid is found in the LCRS sump:
  - i. The Regional Water Board shall be notified verbally within **seven days**, and
  - ii. Collect at least one sample of the leachate within **30 days** and analyze it for the Monitoring Parameters and 5-Year COCs used for groundwater monitoring.

### F. Corrective Action Monitoring

There is no corrective action monitoring program required at this time.

## PART III: EVALUATION OF MONITORING DATA

Part III of this MRP provides the requirements for the analysis of detection, evaluation, and corrective action monitoring data collected from monitoring wells associated with the Facility.

### A. Water Quality Protection Standard

For each waste management unit, the Water Quality Protection Standard (Water Standard) consists of all COCs (under title 27, section 20395), the concentration limit for each COC (under title 27, section 20400), and the points of compliance for each monitored medium (under title 27, section 20405) for the duration of the compliance period (under title 27, section 20410).

#### 1. Constituents of Concern (COCs)

The COCs are as defined above in Part II.A.2 and include both Monitoring Parameters and 5-Year COCs.

#### 2. Concentration Limits

- a. **Default Limits.** The following concentration limits shall apply, unless the Regional Water Board approves a Concentration Limit Greater than



evaluate data collected during monitoring. In addition, USEPA published *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (EPA 530/R-09-007) in 2009.

- b. The Discharger shall evaluate the data obtained during a monitoring period using either a statistical or non-statistical method described in title 27 or may propose another method for approval by the Regional Water Board's Executive Officer, as long as it achieves the goal of the monitoring program at least as well as the most appropriate method described in title 27, section 20415.
- c. The Discharger shall propose data analysis methods to be used in evaluating water quality monitoring data for each COC. (Cal. Code Regs., tit. 27, § 20415(e)(7).) The specifications for each data analysis method shall include a detailed description of the criteria to be used for determining "measurably significant" (as that term is defined in title 27, section 20164) evidence of any release from the waste management unit and for determining compliance with the Water Quality Protection Standard.
- d. Monitoring reports shall describe the statistical or non-statistical method used for each COC at each monitoring point.

## **2. Background Values**

- a. Pursuant to California Code of Regulations, title 27, section 20415(e)(10), the Discharger shall in a technical report justify the use of a procedure for determining the background value for each COC.
- b. Inter-well comparisons may be used where upgradient and downgradient wells intercept the same aquifer and are expected to have similar concentrations of naturally occurring constituents. Intra-well comparisons shall be used where uncontaminated background wells are not present, or the chemical composition of upgradient and downgradient wells are significantly different.
- c. In establishing background values for COCs, the Discharger shall ensure that sampling methods used comply with California Code of Regulations, title 27, section 20415(e)(12), including that the number and kinds of samples collected must be appropriate for the form of data analysis employed and, in the case of statistical data analysis, follow generally accepted statistical principles. The sampling method (including the sampling frequency and the interval of time between successive samples) shall be appropriate for the medium from which samples are taken (e.g., groundwater, surface water, and soil-pore liquid). (See also Cal. Code Regs., tit. 27, § 20415(e)(6).) For groundwater, sampling shall be scheduled to include the times of expected highest and lowest elevations of the potentiometric surface.

### 3. Determination of Measurably Significant Evidence of a Release

- a. Initial Determination of Measurably Significant Evidence of a Release. The Discharger shall use a statistical or nonstatistical data analysis method that complies with California Code of Regulations, title 27, section 20415(e)(7)-(10) to compare the concentration of each COC with its respective background concentration to determine whether there has been measurably significant evidence of a release from the waste management unit. Whenever a COC is detected at a detection monitoring point at a concentration that exceeds the concentration limit from the Water Standard, the Discharger shall preliminarily conclude that there is measurably significant evidence of a release and follow the notification procedures in Part II.E.1. (Cal. Code Regs., tit. 27, § 20420(i).)
- b. Confirmation of a Measurably Significant Evidence of a Release. If there is a preliminary indication of a release, within **30 days** of such indication (Cal. Code Regs., tit. 27, § 20415(e)(8)(E)(3)), the Discharger may implement a verification procedure/retest option in accordance with California Code of Regulations, title 27, section 20415(e)(8)(E).<sup>9</sup>
  - i. Retest Method. The verification procedure shall include either: (1) a single “composite” retest (i.e., a statistical analysis that augments and reanalyzes the data from the monitoring point that indicated a release), or (2) at least two “discrete” retests (i.e., statistical analyses, each of which analyzes only newly-acquired data from the monitoring point that indicated a release). (Cal. Code Regs., tit. 27, § 20415(e)(8)(E).) The Discharger may use an alternate method with prior approval by the Regional Water Board that complies with the requirements of title 27, section 20415(e)(8)(E) in addition to the performance standards of title 27, section 20415(e)(9).
  - ii. Retest Samples. The retest samples shall be collected from the monitoring point where the release is preliminarily indicated and shall be analyzed for the constituents that caused the need for the retest. (Cal. Code Regs., tit. 27, § 20415(e)(8)(E)(7).)
  - iii. Retest Reporting. The Discharger shall report to the Regional Water Board the results of both the initial statistical test and the results of the verification procedure, as well as all concentration data collected for use in these tests, within **seven days** of the last laboratory

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<sup>9</sup> Under California Code of Regulations, title 27, section 20420(k)(7), the Discharger may also demonstrate that a source other than the waste management unit caused the release.

analysis of the samples collected for the verification procedure. (Cal. Code Regs., tit. 27, § 20415(e)(8)(E)(6).)

If the retest results of one or more of the retest data suites confirm the original indication, the Discharger shall conclude that measurably significant evidence of a release has been confirmed. The Discharger shall then follow the procedures identified in Part II.E.2.

#### **PART IV: REPORTS TO BE FILED WITH THE REGIONAL WATER BOARD**

Part IV provides a description of the reports required to be submitted to the Regional Water Board for the Facility.

##### **A. Required Reports**

1. **Semi-Annual Monitoring Reports** – For each monitored medium, all monitoring results shall be reported semi-annually. Semi-Annual Monitoring Reports shall include, at a minimum, the following:
  - a. **Topographic Map.** A topographic map (or copy of an aerial photograph), at an appropriate scale, identifying the Facility, the locations of observation stations, monitoring points, background monitoring points, and the groundwater elevation contours with interpreted groundwater flow direction and gradient.
  - b. **Groundwater Elevations.** The method and time of groundwater elevation measurements, a description of the method used to purge the well and collect groundwater samples, and quality assurance/quality control (QA/QC) procedures used. The groundwater elevations shall be corrected for groundwater density using field measurements of groundwater density, depth to groundwater and depth to the bottom of the wells. A figure depicting the groundwater elevation contours, corrected for density, shall be included in the report.
  - c. **Field Logs.** Field logs used during well purging and sampling. At a minimum, the field logs should include the following:
    - i. The well number,
    - ii. The sampling date and time,
    - iii. The method of monitoring Field Monitoring Parameters and calibration of equipment used to monitor Field Monitoring Parameters,

- iv. The purge method (if a pump is used, include the depth of pump placement in each well and the pumping rate), and
  - v. The purge and sample collection information such as: date each well was purged; well recovery time; method of disposal of the purged water; an estimate of the volume of water purged from each well; the results of all field analyses; depth to groundwater prior to purging, at the conclusion of purging, and when the sample was collected; the method of measuring the water level; and field personnel names and signature.
- d. **Data Tables.** Cumulative tabulated monitoring data for all monitoring points and constituents (including the Monitoring Parameters and 5-Year COCs). Concentrations below the laboratory reporting limit shall not be reported as “ND,” unless the reporting limit is also given in the table. Otherwise, they shall be reported “<” next to the reporting limit (e.g., <0.10). Upon request of Regional Water Board staff, data files shall be provided electronically in a file format approved by the Regional Water Board. Any electronic files submitted to the Regional Water Board in accordance with Order R7-2022-0011 and this MRP, shall not be password protected.
- e. **Graphical Display.** For monitoring wells in corrective action or evaluation monitoring, a graphical display of groundwater concentrations for all COCs for which there is measurably significant evidence of a release, including all historical data for those COCs from at least 5 years prior to the detection of a release at that location. Each graph shall plot the concentration of one or more constituents at an appropriate scale that allows changes in concentrations to be discerned, including the use of a semi-log scale for concentrations that change by more than three orders of magnitude.
- f. **Summary of Groundwater Conditions.** A written summary of the monitoring results and any changes to the groundwater monitoring system since the previous report. The written summary shall include a discussion of the groundwater flow rate and direction,<sup>10</sup> the appearance of trends or other information that may indicate a

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<sup>10</sup> The estimated quarterly groundwater flow rate and direction in the uppermost aquifer, in any zones of perched water, and in any additional zone of saturation monitored based upon water level elevations taken prior to the collection of the water quality data submitted in the report. (Cal. Code Regs., tit 27, § 20415(e)(15).)

potential change in the hydrogeologic conditions beneath and adjacent to the Facility.

- g. **Evaluation of Groundwater Data.** An evaluation of the groundwater monitoring data analyzed according to the methods described in Part III of this MRP, and whether the analysis indicates a release of waste constituents or waste degradation products from the Facility.
- h. **Leachate Evaluation.** A summary of leachate data for each applicable waste management unit, including any laboratory results and measurements of the height of liquids in LCRS sumps. The Discharger shall also calculate the leakage rate.
- i. **Sludge/Solids Evaluation.** A summary of sludge data for each applicable waste management unit.
- j. **Waste Volumes.** A summary of all required information concerning waste volumes for each applicable waste management unit.

**2. Annual Summary Report** – The Discharger shall submit an annual report covering the period from January 1 through December 31 to the Regional Water Board. If desired, the Annual Monitoring Report may be combined with the Semi-Annual Monitoring Report, but if so, shall clearly state that it is both a semi-annual and annual monitoring report in its title. The Annual Summary Report shall include, at a minimum, the following:

- a. **Summary of Groundwater Monitoring Data.** A written summary of the groundwater monitoring results, indicating any changes made or observed since the previous Annual Summary Report. If a 5-year COC event was performed, then these parameters shall be presented in tabular format. All analytical data obtained during the previous year shall be presented in tabular form. Upon request of the Regional Water Board, the data shall be provided electronically in a file format and media acceptable to the Regional Water Board.
- b. **Graphical Display.** A graphical display for all data collected for each monitoring point and background monitoring point. Each graph shall plot the concentration of one or more constituents over time for a given monitoring point. For any given constituent, the scale for all plots should be the same to facilitate comparison and identification of trends. On the basis of any outliers noted in the plotted data, the Regional Water Board may direct the Discharger to carry out a preliminary investigation, in accordance with Part II.E of this MRP, to determine whether a release is indicated. Trend analyses shall include identification of current trends, a comparison

to previously identified trends, and a discussion of any significant changes in the trends. This shall be prepared for groundwater and any unsaturated/vadose zone monitoring points (including subdrains, lysimeters, or landfill gas).

- c. **Background Concentration Limits Update.** Reevaluate background concentration limits (required every five years per Part III.A.2.c) and propose any appropriate changes.
- d. **Leachate Data Summary.** A summary of leachate data for each applicable waste management unit, consisting of the monthly total volume of leachate collected during the reporting year from the LCRS and any other leachate collection systems to demonstrate the effectiveness of the leachate collection and removal system. This summary shall contain a brief discussion of the leachate sampling results and volume produced and how the leachate was disposed of during the reporting period. This summary shall also include a table consisting of the last five years of leachate data collected at the Facility.
- e. **Annual Waste Summary.** An annual summary consisting of the total volume of geothermal wastes generated at the waste management unit. The summary shall contain a table that lists each category of waste and the volume accepted at the waste management unit during the reporting period.
- f. **Site Conditions Summary.** Include a comprehensive discussion regarding the condition of the Facility, including, but not limited to, interim cover areas, the current operational area, maintenance roads, the erosion and drainage control measures implemented to control run-on and run-off during the rainy season, the condition of monitoring wells, piezometers, and any other monitoring device located at the Facility. The discussion should also highlight any areas of noncompliance observed and repaired during the previous year and should be documented with photographs and inspection reports.
- g. **Compliance Summary.** Include a comprehensive discussion of the compliance issues during the reporting period (the past year), and of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the Order or this MRP.

## B. Report Schedule

Semi-annual monitoring reports shall be submitted to the Regional Water Board in accordance with the following schedule:

**Table 9. Semi-Annual Reporting Schedule**

Monitoring Period	Report Due
January – June	August 15
July - December	March 15

Annual monitoring reports shall be submitted to the Regional Water Board by March 15 of the following year.

## C. Standard Reporting Procedures

1. A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including any references to previously submitted time schedules, is contained in the accompanying report.
2. In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner as to clearly illustrate whether the Facility is operating in compliance with the WDRs. Where appropriate, the Discharger shall include supporting calculations (e.g., for monthly averages).
3. The results of any analysis taken more frequently than required at the locations specified in this MRP shall be reported to the Regional Water Board.
4. As specified in Standard Provision I.13, all monitoring reports shall be certified under penalty of perjury to be true and correct. Each report shall contain the following completed declaration:

“I certify under the penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there

are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

Executed on the \_\_\_\_\_ day of \_\_\_\_\_ at \_\_\_\_\_

\_\_\_\_\_(Signature)

\_\_\_\_\_(Title)"

5. The monitoring reports and any other information requested by the Regional Water Board shall be signed by a principal executive officer or ranking elected official. A duly authorized representative of the Discharger may sign the documents if:
  - a. The authorization is made in writing by the person described above;
  - b. The authorization specified an individual or person having responsibility for the overall operation of the regulated disposal system; and
  - c. The written authorization is submitted to the Regional Water Board's Executive Officer.
6. As specified in Standard Provision I.12, technical reports shall be prepared by or under the direction of appropriately qualified professional(s). Each technical report submitted shall contain a statement of qualifications of the responsible licensed professional(s) as well as the professional's signature and/or stamp of the seal.
7. As specified in Standard Provision I.11, the Discharger shall comply with Electronic Submittal of Information (ESI) requirements by submitting all correspondence and reports required under this MRP and future revisions thereto, including groundwater monitoring data and discharge location data (latitude and longitude), correspondence, and monitoring reports to the State Water Board's GeoTracker database. Documents that are too large to be uploaded into GeoTracker should be broken down into smaller electronic files and labelled properly prior to uploading into GeoTracker.